
**ASSAM UNIVERSITY, SILCHAR**

**SYLLABUS UNDER**

**CHOICE BASED CREDITSYSTEM**

# BACHELOR IN COMPUTER APPLICATION (BCA)

# (General)

# Course Structure

## DETAILS OF COURSES FOR BACHELORCOMPUTER APPLICATION (Honours)

## BCA Honours

| Core Course | Credits | |
|---|---|---|
| | Theory+ Practical | Theory + Tutorial |
| **I. Core Course** | | |
| Core Course Theory (14 papers) | 14X4= 56 | 14X5=70 |
| Core Course Practical / Tutorial* (14 papers) | 14X2=28 | 14X1=14 |
| **II. Elective papers (8 papers)** | | |
| A.1. Discipline Specific Elective (4papers) | 4X4=16 | 4X5=20 |
| A.2Discipline Specific Elective Practical / Tutorial* (4papers) | 4 X 2=8 | 4X1=4 |
| B.1. Generic Elective (4papers) to be chosen from other discipline | 4X4=16 | 4X5=20 |
| B.2. Generic Elective Practical / Tutorial* (4papers) | 4 X 2=8 | 4X1=4 |
| **III. Ability Enhancement Courses** | | |
| 1. Ability Enhancement Compulsory (2 Papers) | | |
| Environmental APPLICATION | 1 X 4=4 | 1 X 4=4 |
| English/MIL Communication | 1 X 4=4 | 1 X 4=4 |
| 2. Ability Enhancement Elective (Skill Based) (2 Papers) | 2 X 2=4 | 2 X 3=6 |
| Ability Enhancement Elective (Skill Based) Practical / Tutorial* (2 Papers | 2 X 2=4 | 2 X 1=2 |
| Total Credit | 148 | 148 |

• Each credit is equivalent to 1 hour of activity per week

**TDC (CBCS) Course Structure**
**BCA Pass**
**Total Course = 24 Total Credits = 132, Total Marks = 2400**

| | **Honours Subject** | | | **Compulsory Subjects** | | **Semester wise total** | | |
|---|---|---|---|---|---|---|---|---|
| | **CORE**<br>Credits = 6<br>Marks = 100 | **DSE**<br>Credits = 6<br>Marks = 100 | **SEC**<br>Credits = 4<br>Marks = 100 | **AECC 1**<br>Credits = 4<br>Marks = 100 | **AECC 2**<br>Credits = 4<br>Marks = 100 | Papers | Credits | Marks |
| I | **C-1A:**Computer Fundamentals (4)<br>**C-1A-Lab:**Practical on Computer Fundamentals (2)<br>C-2A:<br>C-3A: | | | Eng. Communication / MIL Communication | | 4 | 22 | 400 |
| II | **C-1B:**Introduction to Programming (4)<br>**C-1B-Lab:**Practical on Programming using C and C++ (2)<br>C-2B:<br>C-3B: | | | | Environmental Studies | 4 | 22 | 400 |
| III | **C-1C:**Computer Networks (4)<br>**C-1C-Lab:**Practical on Network Programming (2)<br>C-2C:<br>C-3C: | | **SEC-1:**Open Source Software (2)<br>**SEC-1-Lab:** Practical on Open Source Software (2) | | | 4 | 28 | 500 |
| IV | C-1D: Introduction to Database Systems (4)<br>C-1D-Lab: Practical on Database Systems (2)<br>C-2D:<br>C-3D: | | **SEC-2:** Programming in Python (2)<br>**SEC-2-Lab:** Practical on Programming in Python (2) | | | 4 | 28 | 500 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| V | | **DSE-1A:** Internet Technologies (4)<br>**DSE-1A-Lab:** Practical on Internet Technologies (2)<br>DSE-2A:<br>DSE-3A: | **SEC-3**: Programming in Java **(2)**<br>**SEC-3-Lab**: Practical on Java **(2)** | | | 4 | 24 | 400 |
| VI | | **DSE-1B:**Project work/ Dissertation (6)<br>**DSE-2B:**<br>**DSE-3B:** | **SEC-4:** PHP Programming **(2)**<br>**SEC-4-Lab:** Practical on PHP Programming **(2)** | | | 4 | 24 | 400 |
| **Total** | **12** | **6** | **4** | **1** | **1** | **24** | **132** | **2400** |

**N.B. Compulsory papers:**
i. AECC1 – English Communication/MIL
ii. AECC2 – Environment Studies

*Out of the 4 (Four) SEC papers, a student has to choose minimum 1 (One) paper and can choose a maximum 2 (Two) papers.

**CCA** – Continuous and Comprehensive Assessment (Internal Assessment), **ESE** – End Semester Examinations, **FM** – Full Marks, **PM** – Pass Marks

## COMPUTER APPLICATION- C-1A

### Computer Fundamentals

**(**Credits: 04**)**

Total marks: 70 (ESE: 50; CCA: 20)

Pass marks: 28 (ESE: 20; CCA: 8)

*Objective: Computer Fundamentals is a course that's designed specifically for those who are completely new to computers. This syllabus has been prepared for the beginners as well as advanced learners who want to deal with computers. After completing these contents you will find yourself at a moderate level of expertise in knowledge of computer basics from where you can take yourself to next levels.*

**Unit 1:** Introduction: Introduction to computer system, uses, types. Data Representation: Number systems and character representation, binary arithmetic Human

**Unit 2:** Computer Interface: Types of software, Operating system as user interface, utility programs. Devices: Input and output devices (with connections and practical demo), keyboard, mouse, joystick, scanner, OCR, OMR, bar code reader, web camera, monitor, printer, plotter.

**Unit 3:** Memory: Primary, secondary, auxiliary memory, RAM, ROM, cache memory, hard disks, optical disks.

**Unit 4:** Computer Organization and Architecture: C.P.U., registers, system bus, main memory unit, cache memory, Inside a computer, SMPS, Motherboard, Ports and Interfaces, expansion cards, ribbon cables, memory chips, processors.Overview of Emerging Technologies: Bluetooth, cloud computing, big data, data mining, mobile computing and embedded systems.

**Unit 5:** Use of Computers in Education and Research: Data analysis, Heterogeneous storage, e-Library, Google Scholar, Domain specific packages such as SPSS, Mathematica etc.

**Reference Books:**


1. A. Goel, Computer Fundamentals, Pearson Education, 2010.
2. P. Aksoy, L. DeNardis, Introduction to Information Technology, Cengage Learning, 2006
3. P. K.Sinha, P. Sinha, Fundamentals of Computers, BPB Publishers, 2007

**COMPUTER APPLICATION-C-1A-LAB**

**Practical on Computer Fundamentals**

**(**Credits: 02**)**

Total marks: 30[**] (CCA + ESE = 30)

Pass marks: 12 (CCA + ESE = 12)

[**]*For each practical course, CCA component of total marks may be included in ESE in the following items along with practical experiments etc.: Practical experiments etc. max. marks = 21; Attendance max. marks = 05; Regularity in maintenance of laboratory note book max. marks = 02 and viva-voce max. marks = 02.*]

**Practical:**

*Practical exercises based on Open Office tools using document preparation and spreadsheet handling packages.*

The practical assignment must include connecting parts of a computer and assembling it to an extent, media formatting and installation of some software.

Practical exercises based on Open Office tools using document preparation and spreadsheet handling packages.

**Text Editor**

1. Prepare **a grocery list** having four columns (Serial number, The name of the product, quantity and price) for the month of April, 06.

    - Font specifications for Title (Grocery List): 14-point Arial font in bold and italics.
    - The headings of the columns should be in 12-point and bold.
    - The rest of the document should be in 10-point Times New Roman.
    - Leave a gap of 12-points after the title.

2. Create a **telephone directory**.
    - The heading should be 16-point Arial Font in bold
    - The rest of the document should use 10-point font size
    - Other headings should use 10-point Courier New Font.
    - The footer should show the page number as well as the date last updated.

3. Design a **time-table form** for your college.
    - The first line should mention the name of the college in 16-point Arial Font and should be bold.
    - The second line should give the course name/teacher's name and the department in 14-point Arial.
    - Leave a gap of 12-points.
    - The rest of the document should use 10-point Times New Roman font.
    - The footer should contain your specifications as the designer and date of

creation.

4. BPB Publications plans to release a new book designed as per your syllabus. Design the **first**
**page of the book** as per the given specifications.
   - The title of the book should appear in bold using 20-point Arial font.
   - The name of the author and his qualifications should be in the center of the page in 16-point Arial font.
   - At the bottom of the document should be the name of the publisher and address in 16-point Times New Roman.
   - The details of the offices of the publisher (only location) should appear in the footer.

5. Create the following one page documents.
   a. Compose a note inviting friends to a get-together at your house, Including a list of things to bring with them.
   b. Design a certificate in landscape orientation with a border around the document.
   c. Design a Garage Sale sign.
   d. Make a sign outlining your rules for your bedroom at home, using a numbered list.

6. Create the following documents:

   (a) A newsletter with a headline and 2 columns in portrait orientation, including at least one image surrounded by text.
   (b) Use a newsletter format to promote upcoming projects or events in your classroom or college.

7. Convert following text to a table, using comma as delimiter

   Type the following as shown (do not bold).
   **Color, Style, Item**
   **Blue, A980, Van**
   **Red, X023, Car**
   **Green, YL724, Truck**
   **Name, Age, Sex**
   **Bob, 23, M**
   **Linda, 46, F**
   **Tom, 29, M**

9. Enter the following data into a table given on the next page.

| Salesperson | Dolls | Trucks | Puzzles |
|---|---|---|---|
| Kennedy, Sally | 1327 | 1423 | 1193 |

| | | | |
|---|---|---|---|
| White, Pete | 1421 | 3863 | 2934 |
| Pillar, James | 5214 | 3247 | 5467 |
| York, George | 2190 | 1278 | 1928 |
| Banks, Jennifer | 1201 | 2528 | 1203 |
| Atwater, Kelly | 4098 | 3079 | 2067 |

Add a column Region (values: S, N, N,S,S,S) between the Salesperson and Dolls columns to the given table Sort your table data by Region and within Region by Salesperson in ascending order:

In this exercise, you will add a new row to your table, place the word "Total" at the bottom of the Salesperson column, and sum the Dolls, Trucks, and Puzzles columns.

10. Wrapping of text around the image.

11. Create your resume by incorporating most of the options learned till now.
12. Following features of menu option must be covered

| | |
|---|---|
| FILE | Complete menu |
| EDIT | Complete menu |
| VIEW | Complete menu |
| INSERT | Complete menu |
| FORMAT | Complete menu |
| TABLE | Complete menu |
| WINDOW | Complete menu |
| HELP | Complete menu |
| TOOLS | All options except Online collaboration, Tools on Macro, Templates |

**Spreadsheet**

1. Enter the Following data in Excel Sheet

**REGIONAL SALES PROJECTION**

| State | Qtr1 | Qtr2 | Qtr3 | QTR4 | Qtr Total | Rate Amount |
|---|---|---|---|---|---|---|
| Delhi | 2020 | 2400 | 2100 | 3000 | 15 | |
| Punjab | 1100 | 1300 | 1500 | 1400 | 20 | |
| U.P. | 3000 | 3200 | 2600 | 2800 | 17 | |
| Harayana | 1800 | 2000 | 2200 | 2700 | 15 | |
| Rajasthan | 2100 | 2000 | 1800 | 2200 | 20 | |

**TOTALAVERAGE**

(a) Apply Formatting as follow:

I. Title in TIMES NEW ROMAN

ii. Font Size - 14

iii. Remaining text - ARIAL, Font Size -10

iv. State names and Qtr. Heading Bold, Italic with Gray Fill Color.

v. Numbers in two decimal places.

vi. Qtr. Heading in center Alignment.

vii. Apply Border to whole data.

(b) Calculate State and Qtr. Total

(c) Calculate Average for each quarter

(d) Calculate Amount = Rate * Total.

2. Given the following worksheet

| | A | B | C | D |
|---|---|---|---|---|
| 1 | Roll No. | Name | Marks | Grade |
| 2 | 1001 | Sachin | 99 | |
| 3 | 1002 | Sehwag | 65 | |
| 4 | 1003 | Rahul | 41 | |
| 5 | 1004 | Sourav | 89 | |
| 6 | 1005 | HarBhajan | 56 | |

Calculate the grade of these students on the basis of following guidelines:

| If Marks | Then Grade |
|---|---|
| >= 80 | A+ |
| >= 60 < 80 | A |
| >= 50 < 60 | B |
| < 50 | F |

3. Given the following worksheet

| | A | B | C | D | E | F | G |
|---|---|---|---|---|---|---|---|
| 1 | **Salesman** | | | **Sales in (Rs.)** | | | |
| 2 | No. | Qtr1 | Qtr2 | Qtr3 | Qtr4 | Total | Commission |
| 3 | S001 | 5000 | 8500 | 12000 | 9000 | | |
| 4 | S002 | 7000 | 4000 | 7500 | 11000 | | |
| 5 | S003 | 4000 | 9000 | 6500 | 8200 | | |
| 6 | S004 | 5500 | 6900 | 4500 | 10500 | | |

| | | | | | |
|---|---|---|---|---|---|
| 7 | S005 | 7400 | 8500 | 9200 | 8300 |
| 8 | S006 | 5300 | 7600 | 9800 | 6100 |

Calculate the commission earned by the salesmen on the basis of following Candidates:

| **If Total Sales** | **Commission** |
|---|---|
| < 20000 | 0% of sales |
| > 20000 and < 25000 | 4% of sales |
| > 25000 and < 30000 | 5.5% of sales |
| > 30000 and < 35000 | 8% of sales |
| >= 35000 | 11% of sales |

The total sales is sum of sales of all the four quarters.

4. A company XYZ Ltd. pays a monthly salary to its employees which consists of basic salary, allowances & deductions. The details of allowances and deductions are as follows:

**Allowances**

- HRA Dependent on Basic
  30% of Basic if Basic <=1000
  25% of Basic if Basic>1000 & Basic<=3000
  20% of Basic if Basic >3000
- DA Fixed for all employees, 30% of Basic
- Conveyance Allowance Rs. 50/- if Basic is
  <=1000Rs. 75/- if Basic >1000 &
  Basic<=2000
  Rs. 100 if Basic >2000
- Entertainment Allowance NIL if Basic is <=1000
  Rs. 100/- if Basic > 1000

**Deductions**

- Provident Fund 6% of Basic
- Group Insurance Premium Rs. 40/- if Basic is <=1500
  Rs. 60/- if Basic > 1500 & Basic<=3000
  Rs. 80/- if Basic >3000

Calculate the following:

Gross Salary = Basic + HRA + DA + Conveyance + Entertainment

Total deduction = Provident Fund + Group Insurance Premium

Net Salary = Gross Salary – Total Deduction

5. Create Payment Table for a fixed Principal amount, variable rate of interests and time in the format below:

| No. of Instalments | 5% | 6% | 7% | 8% | 9% |
|---|---|---|---|---|---|
| 1 | XX | XX | XX | XX | XX |
| 2 | XX | XX | XX | XX | XX |
| 3 | XX | XX | XX | XX | XX |

| | | | | | |
|---|---|---|---|---|---|
| 4 | XX | XX | XX | XX | XX |

6. Use an array formula to calculate Simple Interest for given principal amounts given the rate of Interest and time

| | |
|---|---|
| Rate of Interest | 8% |
| Time | 5 Years |
| Principal | Simple Interest |
| 1000 | ? |
| 18000 | ? |
| 5200 | ? |

7. The following table gives year wise sale figure of five salesmen in Rs.

| **Salesman** | **2000** | **2001** | **2002** | **2003** |
|---|---|---|---|---|
| S1 | 10000 | 12000 | 20000 | 50000 |
| S2 | 15000 | 18000 | 50000 | 60000 |
| S3 | 20000 | 22000 | 70000 | 70000 |
| S4 | 30000 | 30000 | 100000 | 80000 |
| S5 | 40000 | 45000 | 125000 | 90000 |

(*a*) Calculate total sale year wise.
(*b*) Calculate the net sale made by each salesman
(*c*) Calculate the maximum sale made by the salesman
(d) Calculate the commission for each salesman under the condition.
(*i*) If total sales >4,00,000 give 5% commission on total sale made by the salesman.
(*ii*) Otherwise give 2% commission.
(*e*) Draw a bar graph representing the sale made by each salesman.
(*f*) Draw a pie graph representing the sale made by salesman in 2000.

8. Enter the following data in Excel Sheet

**PERSONAL BUDGET FOR FIRST QUARTER**

**Monthly Income (Net): 1,475**

| **EXPENSES** | **JAN** | **FEB** | **MARCH** | **QUARTER TOTAL** | **QUARTER AVERAGE** |
|---|---|---|---|---|---|
| Rent600.00 | 600.00 | 600.00 | | | |
| Telephone | 48.25 | 43.50 | 60.00 | | |
| Utilities | 67.27 | 110.00 | 70.00 | | |
| Credit Card | 200.00 | 110.00 | 70.00 | | |
| Oil | 100.00 | 150.00 | 90.00 | | |
| AV to Insurance | 150.00 | | | | |
| Cable TV | 40.75 | 40.75 | 40.75 | | |

**Monthly Total**

(a) Calculate Quarter total and Quarter average.
(b) Calculate Monthly total.
(c) Surplus = Monthly income - Monthly total.
(d) What would be total surplus if monthly income is 1500.
(e) How much does telephone expense for March differ from quarter average.
(f) Create a 3D column graph for telephone and utilities.
(g) Create a pie chart for monthly expenses.

**9.** Enter the following data in Excel Sheet

**TOTAL REVENUE EARNED FOR SAM'S BOOKSTALL**

| **Publisher name** | **1997** | **1998** | **1999** | **2000** | **total** |
|---|---|---|---|---|---|
| A | Rs. 1,000.00 | Rs. 1100.00 | Rs. 1,300.00 | Rs. 800.00 | |
| B | Rs. 1,500.00 | Rs. 700.00 | Rs. 1,000.00 | Rs. 2,000.00 | |
| C | Rs. 700.00 | Rs. 900.00 | Rs. 1,500.00 | Rs. 600.00 | |
| D | Rs. 1,200.00 | Rs. 500.00 | Rs. 200.00 | Rs. 1,100.00 | |
| E | Rs 800.00 | Rs. 1,000.00 | Rs. 3,000.00 | Rs. 560.00 | |

(a) Compute the total revenue earned.
(b) Plot the line chart to compare the revenue of all publisher for 4 years.
(b) Chart Title should be 'Total Revenue of sam's Bookstall (1997-2000)'
(c) Give appropriate categories and value axis title.

10. Generate 25 random numbers between 0 & 100 and find their sum, average and count. How many no. are in range 50-60

COMPUTER APPLICATION- C-1B

# INTRODUCTION TO PROGRAMMING

(Credits: 04)

Total marks: 70 (ESE: 50; CCA: 20)
Pass marks: 28 (ESE: 20; Sessional: 8)

## Unit I

**Introduction to C and C++**

History of C and C++, Overview of Procedural Programming and Object-Orientation Programming, Using main() function, Compiling and Executing Simple Programs in C++.

**Data Types, Variables, Constants, Operators and Basic I/O**

Declaring, Defining and Initializing Variables, Scope of Variables, Using Named Constants, Keywords, Data Types, Casting of Data Types, Operators (Arithmetic, Logical and Bitwise), Using Comments in programs, Character I/O (getc, getchar, putc, putcharetc), Formatted and Console I/O (printf(), scanf(), cin, cout), Using Basic Header Files (stdio.h, iostream.h, conio.hetc).

## Unit II

**Expressions, Conditional Statements and Iterative Statements:** Simple Expressions in C++ (including Unary Operator Expressions, Binary Operator Expressions), Understanding Operators Precedence in Expressions, Conditional Statements (if construct, switch-case construct), Understanding syntax and utility of Iterative Statements (while, do-while, and for loops), Use of break and continue in Loops, Using Nested Statements (Conditional as well as Iterative)

## Unit III

**Functions and Arrays:** Utility of functions, Call by Value, Call by Reference, Functions returning value, Void functions, Inline Functions, Return data type of functions, Functions parameters, Differentiating between Declaration and Definition of Functions, Command Line Arguments/Parameters in Functions, Functions with variable number of Arguments.

Creating and Using One Dimensional Arrays ( Declaring and Defining an Array, Initializing an Array, Accessing individual elements in an Array, Manipulating array elements using loops), Use Various types of arrays (integer, float and character arrays / Strings) Two-dimensional Arrays (Declaring, Defining and Initializing Two Dimensional Array, Working with Rows and Columns), Introduction to Multi-dimensional arrays

## Unit IV

**Derived Data Types (Structures and Unions):** Understanding utility of structures and unions, Declaring, initializing and using simple structures and unions, Manipulating individual members of structures and unions, Array of Structures, Individual data members as structures, Passing and returning structures from functions, Structure with union as members, Union with structures as members.

**File I/O, Preprocessor Directives**

Opening and closing a file (use of fstream header file, ifstream, ofstream and fstream classes), Reading and writing Text Files, Using put(), get(), read() and write() functions, Random access in files, Understanding the Preprocessor Directives (#include, #define, #error, #if, #else, #elif, #endif, #ifdef, #ifndef and #undef), Macros.

## Unit V

**Using Classes in C++**

Principles of Object-Oriented Programming, Defining & Using Classes, Class Constructors, Constructor Overloading, Function overloading in classes, Class Variables &Functions, Objects as parameters, specifying the Protected and Private Access, Copy Constructors, Overview of Template classes and their use.

**Inheritance and Polymorphism**
Introduction to Inheritance and Polymorphism

**Reference Books:**
1. HerbtzSchildt, "C++: The Complete Reference", Fourth Edition, McGraw Hill.2003
2. BjarneStroustrup, "The C++ Programming Language", 4th Edition, Addison-Wesley , 2013.
3. BjarneStroustroup, "Programming -- Principles and Practice using C++", 2nd Edition, Addison-Wesley 2014.
4. E Balaguruswamy, "Object Oriented Programming with C++", Tata McGraw-Hill Education, 2008.
5. Paul Deitel, Harvey Deitel, "C++ How to Program", 8th Edition, Prentice Hall, 2011.
6. John R. Hubbard, "Programming with C++", Schaum's Series, 2nd Edition, 2000.
7. Andrew Koeni, Barbara, E. Moo, "Accelerated C++", Published by Addison-Wesley , 2000.
8. Scott Meyers, "Effective C++", 3rd Edition, Published by Addison-Wesley, 2005.
9. Harry, H. Chaudhary, "Head First C++ Programming: The Definitive Beginner's Guide", First Create space Inc, O-D Publishing, LLC USA.2014
10. Walter Savitch, "Problem Solving with C++", Pearson Education, 2007.
11. Stanley B. Lippman, JoseeLajoie, Barbara E. Moo, "C++ Primer", Published by Addison-Wesley, 5th Edition, 2012

COMPUTER APPLICATION - C-1B- LAB
**Practical on Introduction to C/C++ Programming**
(Credits: 02)
Total marks: 30** (CCA + ESE = 30)
Pass marks: 12 (CCA + ESE = 12)

[**For each practical course, CCA component of total marks may be included in ESE in the following items along with practical experiments etc.: Practical experiments etc. max. marks = 21; Attendance max. marks = 05; Regularity in maintenance of laboratory note book max. marks = 02 and viva-voce max. marks = 02.]

1. WAP to print the sum and product of digits of an integer.
2. WAP to reverse a number.
3. WAP to compute the sum of the first n terms of the following series
S = 1+1/2+1/3+1/4+.....
4. WAP to compute the sum of the first n terms of the following series
S =1-2+3-4+5.....
5. Write a function that checks whether a given string is Palindrome or not. Use this function to find whether the string entered by user is Palindrome or not.
6. Write a function to find whether a given no. is prime or not. Use the same to generate the prime numbers less than 100.
7. WAP to compute the factors of a given number.
8. Write a macro that swaps two numbers. WAP to use it.
9. WAP to print a triangle of stars as follows (take number of lines from user):

```
        *
       ***
      *****
     *******
    *********
```

10. WAP to perform following actions on an array entered by the user:
    i) Print the even-valued elements
    ii) Print the odd-valued elements
    iii) Calculate and print the sum and average of the elements of array
    iv) Print the maximum and minimum element of array
    v) Remove the duplicates from the array
    vi) Print the array in reverse order The program should present a menu to the user and ask for one of the options. The menu should also include options to re-enter array and to quit the program.
11. WAP that prints a table indicating the number of occurrences of each alphabet in the text entered as command line arguments.
12. Write a program that swaps two numbers using pointers.
13. Write a program in which a function is passed address of two variables and then alter its contents.
14. Write a program which takes the radius of a circle as input from the user, passes it to another function that computes the area and the circumference of the circle and displays the value of area and circumference from the main() function.
15. Write a program to find sum of n elements entered by the user. To write this program, allocate memory dynamically using malloc() / calloc() functions or new operator.
16. Write a menu driven program to perform following operations on strings:13
    a) Show address of each character in string
    b) Concatenate two strings without using strcat function.
    c) Concatenate two strings using strcat function.
    d) Compare two strings
    e) Calculate length of the string (use pointers)
    f) Convert all lowercase characters to uppercase
    g) Convert all uppercase characters to lowercase
    h) Calculate number of vowels
    i) Reverse the string
17. Given two ordered arrays of integers, write a program to merge the two-arrays to get an ordered array.
18. WAP to display Fibonacci series (i)using recursion, (ii) using iteration
19. WAP to calculate Factorial of a number (i)using recursion, (ii) using iteration
20. WAP to calculate GCD of two numbers (i) with recursion (ii) without recursion.
21. Create Matrix class using templates. Write a menu-driven program to perform following Matrix Operations (2-D array implementation):
    a) Sum b) Difference c) Product d) Transpose
22. Create the Person class. Create some objects of this class (by taking information from the user). Inherit the class Person to create two classes Teacher and Student class. Maintain the
    respective information in the classes and create, display and delete objects of these two classes (Use Runtime Polymorphism).
23. Create a class Triangle. Include overloaded functions for calculating area. Overload assignment operator and equality operator.
24. Create a class Box containing length, breath and height. Include following methods in it:
    a) Calculate surface Area
    b) Calculate Volume
    c) Increment, Overload ++ operator (both prefix & postfix)
    d) Decrement, Overload -- operator (both prefix & postfix)
    e) Overload operator == (to check equality of two boxes), as a friend function

f) Overload Assignment operator

g) Check if it is a Cube or cuboid

Write a program which takes input from the user for length, breath and height to test the above class.

25. Create a structure Student containing fields for Roll No., Name, Class, Year and Total Marks. Create 10 students and store them in a file.

26. Write a program to retrieve the student information from file created in previous question and print it in following format:

Roll No. Name Marks

27. Copy the contents of one text file to another file, after removing all whitespaces.

28. Write a function that reverses the elements of an array in place. The function must accept only one pointer value and return void.14

29. Write a program that will read 10 integers from user and store them in an array. Implement array using pointers. The program will print the array elements in ascending and descending order.

COMPUTER APPLICATION- C-1C

**Computer Networks**

(Credits: 04)

Total marks: 70 (ESE: 50; CCA: 20)

Pass marks: 28 (ESE: 20; CCA: 8)

*This paper provides the basic concepts of networks and functions of different OSI reference model.*

**UNIT I**

**Introduction to Computer Networks:** Network definition; network topologies; network classifications; network protocol; layered network architecture; overview of OSI reference model; overview of TCP/IP protocol suite.

**Data Communication Fundamentals and Techniques:** Analog and digital signal; data-rate limits; digital to digital line encoding schemes; pulse code modulation; parallel and serial transmission; digital to analog modulation-; multiplexing techniques- FDM, TDM; transmission media.

**UNIT II**

**Networks Switching Techniques and Access mechanisms:** Circuit switching; packet switching- connectionless datagram switching, connection-oriented virtual circuit switching; dial-up modems; digital subscriber line; cable TV for data transfer.

**UNIT III**

**Data Link Layer Functions and Protocol:** Error detection and error correction techniques; data-link control- framing and flow control; error recovery protocols- stop and wait ARQ, go-back-n ARQ; Point to Point Protocol on Internet.

**Multiple Access Protocol and Networks:** CSMA/CD protocols; Ethernet LANS; connecting LAN and back-bone networks- repeaters, hubs, switches, bridges, router and gateways;

**UNIT IV**

**Networks Layer Functions and Protocols:** Routing; routing algorithms; network layer protocol of Internet- IP protocol, Internet control protocols.

**UNIT V**

**Transport Layer Functions and Protocols :** Transport services- error and flow control, Connection establishment and release- three way handshake;

**Overview of Application layer protocol:** Overview of DNS protocol; overview of WWW &HTTP protocol.

**Reference Books**

1. B. A. Forouzan: Data Communications and Networking, Fourth edition, TMH ,2007.
2. A. S. Tanenbaum: Computer Networks, Fourth edition, PHI , 2002

COMPUTER APPLICATION- C-1C- LAB

**Practical on Network Programming**

(Credits: 02)

Total marks: 30** (CCA + ESE = 30)

Pass marks: 12 (CCA + ESE = 12)

[**For each practical course, CCA component of total marks may be included in ESE in the following items along with practical experiments etc.: Practical experiments etc. max. marks = 21; Attendance max. marks = 05; Regularity in maintenance of laboratory note book max. marks = 02 and viva-voce max. marks = 02.]

*This paper provides the practical knowledge of network programming.*

1. Simulate Cyclic Redundancy Check (CRC) error detection algorithm for noisy channel.
2. Simulate and implement stop and wait protocol for noisy channel.
3. Simulate and implement go back n sliding window protocol.
4. Simulate and implement selective repeat sliding window protocol.
5. Simulate and implement distance vector routing algorithm
6. Simulate and implement Dijkstra algorithm for shortest path routing.
7. WAP to find the address of the local machine
8. WAP A program that prints the address of www.youtube.com
9. WAP A program that prints all the addresses of www.youtube.com
10. Write a program to implement following methods:
    public String getHostName( )
    public byte[] getAddress( )
    public String getHostAddress( )

11. Describe the following methods in brief:
    public2ooleanisAnyLocalAddress( )
    public2ooleanisLoopbackAddress( )

12. Write a program to testing the characteristics of an IP address i.e. you have to check whether given address is AnyLocalAddress, LoopbackAddress, LinkLocalAddress, SiteLocalAddress or MulticastAddress.
13. Write a program to enter the IP address of any node and check whether a particular node is reachable from the current host.
14. Write a program of protocol tester .It is a simple program for determining which protocols a virtual machine supports. It attempts to construct a URL object for each of 10 URL given below. If the protocol is not supported. A MalformedURLException is thrown and you know the protocol is not supported.

**Test protocols for following URL:**

1. http://www.adc.org
2. https://www.amazon.com/exec/obidos/order2/
3. file:///etc/passwd

4. ftp://metalab.unc.edu/pub/languages/java/javafaq
5. mailto:elharo@metalab.unc.edu
6. telnet://dibner.poly.edu/
7. nfs://utopia.poly.edu/usr/tmp/
8. gopher://gopher.anc.org.za/
9. verbatim:http://www.adc.org/netdoc:/UsersGuide/release.html

COMPUTER APPLICATION-SEC-1

**Open Source Software**

(Credit: 02)

Total marks: 70 (ESE: 50; CCA: 20)

Pass marks: 28 (ESE: 20; CCA: 8)

*Objective: This course provides an overview of the modern context and operation of free and open source software communities and associated software projects. The practical objective is to teach students how they can begin to participate in a FOSS project.*

**Unit I**

Introduction to OSS: introduction, need for open source applications-advantages, disadvantages, history, meaning and extraction of the terms free software and OSS, security and reliability, application of OSS.

**Unit II**

Linux basics: introduction, setting up environment, simple c file and compilation, kernel, basic commands, process: types of process, process states, creation of process, process priorities, scheduling policies, signals - types, sending & receiving signal.

**Unit III**

Android: introduction, open source android platform, history, android architecture, features, Delvik Virtual Machine (DVM), Android Virtual Device or Emulator, File System hierarchy, sample android app.

**Unit IV**

PHP basics: introduction, identifier, variable, constant, data types, operators, statements, PHP loops, PHP script execution, interaction of web browser & web server.

**Unit V**

Open source Grid Computing: introduction, open grid service architecture (OGSA), OGSA definition, OGSA basic services. Open Source Cloud, FOSS Cloud Software: Eucalyptus, OpenNebula – purpose.

**Text Book:**


1. M. N. Rao, “Fundamentals of Open Source Software: A Developer's Perspective”, PHI, 2015.
2. Understanding Open Source and Free Software Licensing – O’Reilly Media, 2011


**ONLINE READING / SUPPORTING MATERIAL:**

1. https://www.tutorialspoint.com/android/index.htm.
2. https://developer.android.com/samples/index.html
3. http://docs.oracle.com/javase/tutorial/index.htm (Available in the form of free downloadable e-books also).

**COMPUTER APPLICATION-SEC-1-LAB**

**Practical on Open Source Software**

(Credits: 02)

Total marks: 30** (CCA + ESE = 30)

Pass marks: 12 (CCA + ESE = 12)

[**For each practical course, CCA component of total marks may be included in ESE in the following items along with practical experiments etc.: Practical experiments etc. max. marks = 21; Attendance max. marks = 05; Regularity in maintenance of laboratory note book max. marks = 02 and viva-voce max. marks = 02.]

**Software Lab Based on Android Programming:**

1. Create ―Hello World‖ application. That will display ―Hello World‖ in the middle of the screen in the emulator. Also display ―Hello World‖ in the middle of the screen in the Android Phone.
2. Create an application with login module. (Check username and password).
3. Create spinner with strings taken from resource folder (res >> value folder) and on changing the spinner value, Image will change.
4. Create a menu with 5 options and and selected option should appear in text box.
5. Create a list of all courses in your college and on selecting a particular course teacher-in-charge of that course should appear at the bottom of the screen.
6. Create an application with three option buttons, on selecting a button colour of the screen will change.
7. Create and Login application as above. On successful login, pop up the message.
8. Create an application to Create, Insert, update, Delete and retrieve operation on the database.

COMPUTER APPLICATION- C-1D

**Introduction to Database Systems**

(Credits: 04)

Total marks: 70 (ESE: 50; CCA: 20)

Pass marks: 28 (ESE: 20; CCA: 8)

***This paper provides the concepts of database management, ER modeling, data model, database design, transaction processing, file structure & indexing.***

**UNIT I**

**Introduction:** Characteristics of database approach, data models, database system architecture and data independence.

**Entity Relationship(ER) Modeling:** Entity types, relationships, constraints.

**UNIT II**

**Relation data model:** Relational model concepts, relational constraints, relational algebra, SQL queries

**UNIT III**

**Database design:** Mapping ER/EER model to relational database, functional dependencies, Lossless decomposition, Normal forms (upto BCNF).

**UNIT IV**

**Transaction Processing:** ACID properties, concurrency control

**UNIT V**

**File Structure and Indexing:** Operations on files, File of Unordered and ordered records, overview of File organizations, Indexing structures for files (Primary index, secondary index, clustering index), Multilevel indexing using B and B+ trees.

**Books Recommended:**


1. R. Elmasri, S.B. Navathe, Fundamentals of Database Systems 6th Edition, Pearson Education, 2010.
2. R. Ramakrishanan, J. Gehrke, Database Management Systems 3rd Edition, McGraw-Hill,
2002.
3. A. Silberschatz, H.F. Korth, S. Sudarshan, Database System Concepts 6th Edition, McGraw
Hill, 2010.
4. R. Elmasri, S.B. Navathe Database Systems Models, Languages, Design and application Programming, 6th Edition, Pearson Education,2013.

COMPUTER APPLICATION- C-1D- LAB

**Practical on Database Systems**

(Credits: 02)

Total marks: 30** (CCA + ESE = 30)

Pass marks: 12 (CCA + ESE = 12)

[**For each practical course, CCA component of total marks may be included in ESE in the following items along with practical experiments etc.: Practical experiments etc. max. marks = 21; Attendance max. marks = 05; Regularity in maintenance of laboratory note book max. marks = 02 and viva-voce max. marks = 02.]

***This paper provides the practical knowledge of Database Management Systems.***

1. Create and use the following database schema to answer the given queries.

**EMPLOYEE Schema**

| **Field** | **Type** | **NULL** | **KEY** | **DEFAULT** |
|---|---|---|---|---|
| Eno | Char(3) | NO | PRI | NIL |
| Ename | Varchar(50) | NO | | NIL |
| Job_type | Varchar(50) | NO | | NIL |
| Manager | Char(3) | Yes | FK | NIL |
| Hire_date | Date | NO | | NIL |
| Dno | Integer | YES | FK | NIL |
| Commission | Decimal(10,2) | YES | | NIL |
| Salary | Decimal(7,2) | NO | | NIL |

**DEPARTMENT Schema**

| **Field** | **Type** | **NULL KEY** | **DEFAULT** |
|---|---|---|---|
| Dno | Integer | No PRI | NULL |
| Dname | Varchar(50) | Yes | NULL |

**Query List**

1. Query to display Employee Name, Job, Hire Date, Employee Number; for each employee with the Employee Number appearing first.
2. Query to display unique Jobs from the Employee Table.
3. Query to display the Employee Name concatenated by a Job separated by a comma.
4. Query to display all the data from the Employee Table. Separate each Column by a comma and name the said column as THE_OUTPUT.
5. Query to display the Employee Name and Salary of all the employees earning more than $2850.
6. Query to display Employee Name and Department Number for the Employee No= 7900.
7. Query to display Employee Name and Salary for all employees whose salary is not in the range of $1500 and $2850.
8. Query to display Employee Name and Department No. of all the employees in Dept 10 and Dept 30 in the alphabetical order by name.
9. Query to display Name and Hire Date of every Employee who was hired in 1981.

10. Query to display Name and Job of all employees who don‘t have a current Manager.
11. Query to display the Name, Salary and Commission for all the employees who earn commission.
12. Sort the data in descending order of Salary and Commission.

13. Query to display Name of all the employees where the third letter of their name is _A‘.
14. Query to display Name of all employees either have two _R‘s or have two _A‘s in their name and are either in Dept No = 30 or their Manger‘s Employee No = 7788.
15. Query to display Name, Salary and Commission for all employees whose Commission Amount is 14 greater than their Salary increased by 5%.
16. Query to display the Current Date.
17. Query to display Name, Hire Date and Salary Review Date which is the 1st Monday after six months of employment.
18. Query to display Name and calculate the number of months between today and the date each employee was hired.
19. Query to display the following for each employee <E-Name> earns < Salary> monthly but wants < 3 * Current Salary >. Label the Column as Dream Salary.
20. Query to display Name with the 1st letter capitalized and all other letter lower case and length of their name of all the employees whose name starts with _J‘, ‘A‘ and _M‘.
21. Query to display Name, Hire Date and Day of the week on which the employee started.
22. Query to display Name, Department Name and Department No for all the employees.
23. Query to display Unique Listing of all Jobs that are in Department # 30.
24. Query to display Name, Dept Name of all employees who have an _A‘ in their name.
25. Query to display Name, Job, Department No. And Department Name for all the employees working at the Dallas location.
26. Query to display Name and Employee no. Along with their Manger‘s Name and the Manager‘s employee no; along with the Employees‘ Name who do not have a Manager.
27. Query to display Name, Dept No. And Salary of any employee whose department No. and salary matches both the department no.And the salary of any employee who earns a commission.
28. Query to display Name and Salaries represented by asterisks, where each asterisk (*) signifies $100.
29. Query to display the Highest, Lowest, Sum and Average Salaries of all the employees
30. Query to display the number of employees performing the same Job type functions.
31. Query to display the no. of managers without listing their names.
32. Query to display the Department Name, Location Name, No. of Employees and the average salary for all employees in that department.
33. Query to display Name and Hire Date for all employees in the same dept. as Blake.
34. Query to display the Employee No. And Name for all employees who earn more than the average salary.
35. Query to display Employee Number and Name for all employees who work in a department with any employee whose name contains a _T‘.
36. Query to display the names and salaries of all employees who report to King.
37. Query to display the department no, name and job for all employees in the Sales department.

**COMPUTER APPLICATION-SEC-2**

**Programming with Python**

**(**Credits: 02**)**

Total marks: 70 (ESE: 50; CCA: 20)

Pass marks: 28 (ESE: 20; CCA: 8)

*Objective: This course provides the basics of Python. The subject will help in learning the basic data types, variables, control flow statements, functions and classes of Python and also how to write a Python program.*

**Unit 1**

Planning the Computer Program: Concept of problem solving, Problem definition,Program design, Debugging, Types of errors in programming, Documentation.
Techniques of Problem Solving: Flowcharting, decision table, algorithms, Structured programming concepts, Programming methodologies viz. top-down and bottom-up programming.

**Unit 2**

Overview of Programming: Structure of a Python Program, Elements of Python.
Introduction to Python: Python Interpreter, Using Python as calculator, Python shell, Indentation. Atoms, Identifiers and keywords, Literals, Strings, Operators (Arithmetic operator, Relational operator, Logical or Boolean operator, Assignment, Operator, Ternary operator, Bit wise operator, Increment or Decrement operator)

**Unit 3**

Creating Python Programs: Input and Output Statements, Control statements (Branching, Looping, Conditional Statement, Exit function, Difference between break, continue and pass.), Defining Functions, default arguments, Errors and Exceptions.Iteration and Recursion: Conditional execution, Alternative execution, Nested conditionals, the return statement, Recursion, Stack diagrams for recursive functions, Multiple assignment, the while statement, Tables, Two-dimensional tables.

**Unit 4**

Strings and Lists: String as a compound data type, Length, Traversal and the for loop,
String slices, String comparison, A find function, Looping and counting, List values, Accessing elements, List length, List membership, Lists and for loops, List operations, List deletion. Cloning lists, Nested lists

**Unit 5**

Object Oriented Programming: Introduction to Classes, Objects and Methods, Standard Libraries.Data Structures: Arrays, list, set, stacks and queues.Searching and Sorting: Linear and Binary Search, Bubble, Selection and Insertion sorting.

**References:**


1. T. Budd, Exploring Python, TMH, 1st Ed, 2011.
2. Allen Downey, Jeffrey Elkner, Chris Meyers. How to think like a computer scientist: learning with Python / 1st Edition,2012 – Freely available online.
3. http://docs.python.org/3/tutorial/index.html

4. http://interactivepython.org/courselib/static/pythonds

**COMPUTER APPLICATION-SEC-2-LAB**

**Practical on Programming with Python**

**(**Credits: 02**)**

Total marks: 30** (CCA + ESE = 30)

Pass marks: 12 (CCA + ESE = 12)

[**For each practical course, CCA component of total marks may be included in ESE in the following items along with practical experiments etc.: Practical experiments etc. max. marks = 21; Attendance max. marks = 05; Regularity in maintenance of laboratory note book max. marks = 02 and viva-voce max. marks = 02.]

1. Using for loop, print a table of Celsius/Fahrenheit equivalences. Let c be the Celsius temperatures ranging from 0 to 100, for each value of c, print the corresponding Fahrenheit temperature.
2. Using while loop, produce a table of sins, cosines and tangents. Make a variable x in range from 0 to 10 in steps of 0.2. For each value of x, print the value of sin(x), cos(x) and tan(x).
3. Write a program that reads an integer value and prints “leap year” or “not a leap year”.
4. Write a program that takes a positive integer n and then produces n lines of output shown as follows.
   For example enter a size: 5
   *
   **
   ***
   ****
   *****
5. Write a function that takes an integer ‘n’ as input and calculates the value of 1 + 1/1! + 1/2! + 1/3! + … + 1/n
6. Write a function that takes an integer input and calculates the factorial of that number.
7. Write a function that takes a string input and checks if it’s a palindrome or not.
8. Write a list function to convert a string into a list, as in list (‘abc’) gives [a, b, c].
9. Write a program to generate Fibonacci series.
10. Write a program to check whether the input number is even or odd.
11. Write a program to compare three numbers and print the largest one.
12. Write a program to print factors of a given number.
13. Write a method to calculate GCD of two numbers.
14. Write a program to sort a list using insertion sort and bubble sort and selection sort..

COMPUTER APPLICATION- DSE-1A

**Internet Technologies**

(Credits: 04)

Total marks: 70 (ESE: 50; CCA: 20)

Pass marks: 28 (ESE: 20; CCA: 8)

*This paper provides the concepts of Internet technologies that are used to develop different interfaces through which user communicate and share information.*

**UNIT I**

Internet, structure of internet, history of internet, Internet protocol: TCP/IP, SLIP, PPP, Network and network devices, Addressing in Internet - DNS, domain name and their organisation, understanding the Internet protocol address, Client-server concept- architecture and application.

Evolution of www, basic features, servers, http, URL, search engine, searching categories, hypertext.

**UNIT II**

Basic HTML, HTML tags, creating list in HTML, hyperlinks, multimedia, HTML forms, tables in HTML, frames in HTML, image maps, style sheets in HTML. DHTML, XML-Introduction, Need for XML, Advantages, simple XML programs, DTD.

**UNIT III**

Creating interactive and dynamic web pages with JavaScript: Client-side scripting languages, JavaScript overview; constants, variables, operators, expressions and statements; user-defined & built-in-functions; properties and methods of built-in objects, client-side form validation.

**UNIT IV**

Server side scripting: ASP, ASP variables, procedures, conditionals, looping, forms, cookies, session, ASP AJAX, ASP VB functions, Accessing a database from an ASP page, ADO connect, ADO recordset.

**UNIT V**

Servlet:overview, environment setup, life cycle, applet vs servlet, form data, client request, server response, http codes, writing filters, exceptions, database access.

**Text/ Reference Books**


1) The Internet – Complete M.L Young ; Tata McGraw Hill
2) Mastering JavaScript and Jscript by J. Jaworski ; BPB Publication
3) Dynamic HTML –the definitive references by D. Godman: Shroff Publishers
4) Understanding XHTML by D.P Nagpal: Wheeler Publishing.
5) Daniel Minoli. Internet and Internet Engineering Tata McGraw-Hill Edition (for Unit I & II)
6) Active Server pages, Keith & Jill, VIkas.
7) Java Script, Gosslin, Vikas
8) Core Java 2, VOl II, Addison Wesley
9) Java Servlets Developer's Guide, Karl Moss, McGraw-Hill/Osborne, 2002

COMPUTER APPLICATION- DSE-1A- LAB

**Practical on Internet Technologies**

(Credits: 02)

Total marks: 30[**] (CCA + ESE = 30)

Pass marks: 12 (CCA + ESE = 12)

[**For each practical course, CCA component of total marks may be included in ESE in the following items along with practical experiments etc.: Practical experiments etc. max. marks = 21; Attendance max. marks = 05; Regularity in maintenance of laboratory note book max. marks = 02 and viva-voce max. marks = 02.]

*This paper provides the practical knowledge of network programming.*

**HTML**

1. Create a HTML document consisting of HTML heading, paragraphs and images.
2. Create a HTML document and insert comments in the HTML source code and insert horizontal lines.
3. Construct HTML document to set the font of a text , size of the font, style of the font.
4. Create a HTML document to show how to create hyperlinks.
5. Create a HTML document to use an image as a link.
6. Create a HTML document to open link in a new browser window.
7. Create a HTML document to jump to another part of a document (on the same page).
8. Create a HTML document to insert images from another folder or another server.
9. Create an image-map, with clickable regions.
10. Create a HTML document with all table elements (Table, Caption, Table Row, Table Data element, Table Heading Element, THEAD, TFOOT, TBODY)
11. Create HTML document to make an unordered list, an ordered list, different types of ordered lists, different types of unordered lists, Nested list, Definition list.
12. Create HTML form with the all FORM elements (text fields, password field, Checkboxes, Radio buttons, Select elements, Drop-down list with a pre-selected value, Textarea (a multi-line text input field) and buttons.
13. Create HTML document with all Frame elements (FRAMESET, FRAME, NOFRAMES, and INLINE FRAME).
14. Create a HTML document to add AUDIO and VIDEO.
15. Create a HTML document to aligning images (Let the image float to the left/right of a paragraph).
16. Create a HTML document to jump to a specified section within a frame
17. Construct a HTML document with CSS to Set the background colour of a page.
18. Construct a HTML document with CSS to set an image as the background of a page
19. Construct HTML document with CSS to Set the text color of different elements and align the text.
20. Construct HTML document to set different colours to visited/unvisited links, Specify a background colour for links

**XML**

21. Construct an XML document that contain information about products of an organization.
22. Construct an XML document that contain information of 5 students (such as roll no., name , address, class).

23. Construct an XML document that contain details of 10 books.

**JAVAScript**

24. Write a program in javasrcript to accept a name from the user and display the same name in an alert box.
25. Write a program in javasrcript to display a message in a confirm box.
26. Write a program in javasrcript to display the message _time is running out‘ in the status bar.
27. Write a program in JavaScript to enter marks of a student and find his/her grade according to the following:
    if marks>=90 then grade A
    if marks>=80 then grade B
    if marks>=70 then grade C
    if marks>=60 then grade D
    else fail.
28. Write a program in JavaScript to create a button and when the button is clicked the message _Hello World‘ is displayed on an alert box.
29. Write a program in JavaScript to accept 2 nos from the user and show the working of all arithmetic operators.
30. Write a program in JavaScript to accept 2 strings and concatenate them.
31. Write a program in JavaScript to display the current date and time.
32. Write a program in JavaScript to find the length of an array.
33. Write a program in JavaScript to check whether a string is palindrome or not.
34. Write a program in JavaScript that responds to a mouse click anywhere on the page(using mouse click).
35. Write a program in JavaScript to display the contents of a check box in a alert box.
36. Write a program to validate a form in the user id and password forms.
37. Write a program in JavaScript to create a welcome cookie, Button animation, Image map with added JavaScript Simple timing, Timing event in an infinite loop

**Servlet/ASP :**

38. Develop a webpage with hypothetical data to do the following
    i. Connecting to database.
    ii. Insert Data To Database.
    iii. Retrieving Data From Database
    iv. Updating Data IntoDatabase.
    v. Deleting Data From Database –

COMPUTER APPLICATION- SEC-3

**Programming in Java**

(Credits: 02)

Total marks: 70 (ESE: 50; CCA: 20)

Pass marks: 28 (ESE: 20; CCA: 8)

*This paper provides the programming concepts in Java.*

**Unit-I**

Introduction to Java, Basic Features, Java Virtual Machine Concepts, A Simple Java Program, Primitive Data Type and Variables, Java Keywords, Integer and Floating Point Data Type, Character and Boolean Types, Declaring and Initialization Variables, Java Operators, Expressions, control statements, Arrays.

**Unit-II**

Class Fundamentals, Creating objects ,Assigning object reference variables ,Introducing Methods, Method overloading, Static methods, Constructors, overloading constructors, This Keyword, Using Objects as Parameters, Argument passing, Returning objects ,Method Overriding, Garbage Collection, The Finalize ( ) Method, Inheritance Basics, Access Control,Multilevel Inheritance, Abstract Classes ,Polymorphism ,Final Keyword, Package, Defining Package, CLASSPATH, Package naming, Accessibility of Packages, Using Package Members, Interfaces, Implementing Interfaces, Interface and Abstract Classes.

**Unit-III**

Exception Handling,Multithreaded Programming, I/O in Java ,Text Streams, Stream Tokenizer, Buffered Stream , Print Stream, Random Access File, The String Class, String Buffer Class, StringTokenizerand Methods.

**Unit-IV**

Applets Programming, Building User Interface with AWT, Swing-based GUI, Layouts and Layout Manager, Container.

**Unit-V**

Java Database Connectivity; Establishing a Connection; Transactions with Database .

**Reference Books**


1. Ken Arnold, James Gosling, David Homes, "The Java Programming Language", 4th Edition, 2005.
2. James Gosling, Bill Joy, Guy L Steele Jr, GiladBracha, Alex Buckley"The Java Language
Specification, Java SE 8 Edition (Java Series)", Published by Addison Wesley, 2014.
3. Joshua Bloch, "Effective Java" 2nd Edition,Publisher: Addison-Wesley, 2008.
4. Cay S. Horstmann, GaryCornell, "Core Java 2 Volume 1 ,9thEdition,Printice Hall.2012
5. Cay S. Horstmann, Gary Cornell, "Core Java 2 Volume 2 - Advanced Features)", 9th Edition, Printice Hall.2013
6. Bruce Eckel, "Thinking in Java", 3rd Edition, PHI, 2002.
7. E. Balaguruswamy, "Programming with Java", 4th Edition, McGraw Hill.2009.
8. Paul Deitel, Harvey Deitel, "Java: How to Program", 10th Edition, Prentice Hall, 2011.

9. "Head First Java", Orielly Media Inc. 2nd Edition, 2005.
10. David J. Eck, "Introduction to Programming Using Java", Published by CreateSpace Independent Publishing Platform, 2009.
11. John R. Hubbard, "Programming with JAVA", Schaum's Series, 2nd Edition, 2004.

COMPUTER APPLICATION- SEC-3- LAB

**Practical on Programming in JAVA**

(Credits: 02)

Total marks: 30** (CCA + ESE = 30)

Pass marks: 12 (CCA + ESE = 12)

[**For each practical course, CCA component of total marks may be included in ESE in the following items along with practical experiments etc.: Practical experiments etc. max. marks = 21; Attendance max. marks = 05; Regularity in maintenance of laboratory note book max. marks = 02 and viva-voce max. marks = 02.]

*This paper provides the practical knowledge of programming in Java.*

1. To find the sum of any number of integers entered as command line arguments
2. To find the factorial of a given number
3. To learn use of single dimensional array by defining the array dynamically.
4. To learn use of lenth in case of a two dimensional array
5. To convert a decimal to binary number
6. To check if a number is prime or not, by taking the number as input from the keyboard
7. To find the sum of any number of integers interactively, i.e., entering every number from the keyboard, whereas the total number of integers is given as a command line argument
8. Write a program that show working of different functions of String and StringBufferclasss like setCharAt(), setLength(), append(), insert(), concat()and equals().
9. Write a program to create a ―distance‖ class with methods where distance is computed in terms of feet and inches, how to create objects of a class and to see the use of this pointer
10. Modify the ―distance‖ class by creating constructor for assigning values (feet and inches) to the distance object. Create another object and assign second object as reference variable to another object reference variable. Further create a third object which is a clone of the first object.
11. Write a program to show that during function overloading, if no matching argument is found, then java will apply automatic type conversions(from lower to higher data type).
12. Write a program to show the difference between public and private access specifiers. The program should also show that primitive data types are passed by value and objects are passed by reference and to learn use of final keyword.
13. Write a program to show the use of static functions and to pass variable length arguments in a function.
14. Write a program to demonstrate the concept of boxing and unboxing.
15. Create a multi-file program where in one file a string message is taken as input from the user
and the function to display the message on the screen is given in another file (make use of Scanner package in this program).
16. Write a program to create a multilevel package and also creates a reusable class to generate Fibonacci series, where the function to generate Fibonacci series is given in a different file belonging to the same package.

17. Write a program that creates illustrates different levels of protection in classes/subclasses belonging to same package or different packages.
18. Write a program ―DivideByZerothat takes two numbers a and b as input, computes a/b, and invokes Arithmetic Exception to generate a message when the denominator is zero.
19. Write a program to show the use of nested try statements that emphasizes the sequence of checking for catch handler statements.
20. Write a program to create your own exception types to handle situation specific to your application (Hint: Define a subclass of Exception which itself is a subclass of Throwable).
21. Write a program to demonstrate priorities among multiple threads.
22. Write a program to demonstrate multithread communication by implementing synchronization among threads (Hint: you can implement a simple producer and consumer problem).
23. Write a program to create URL object, create a URLConnection using the openConnection() method and then use it examine the different components of the URLand content.
24. Write a program to implement a simple datagram client and server in which a message that is typed into the server window is sent to the client side where it is displayed.
25. Write a program that creates a Banner and then creates a thread to scrolls the message in the banner from left to right across the applet‘s window.
26. Write a program to get the URL/location of code (i.e. java code) and document(i.e. html file).
27. Write a program to demonstrate different mouse handling events like mouseClicked(), mouseEntered(), mouseExited(), mousePressed, mouseReleased() and mouseDragged().
28. Write a program to demonstrate different keyboard handling events.
29. Write a program to generate a window without an applet window using main() function.
30. Write a program to demonstrate the use of push buttons.

**COMPUTER APPLICATION-DSE-1B**

**Project work/ Dissertation**

(Credits: 06)

Total marks: 100 (ESE: 70; CCA: 30)

Pass marks: 40 (ESE: 28; CCA: 12)

This option to be offered only in 6th Semester.

The students will be allowed to work on any project based on the concepts studied in core / elective or skill based elective courses.

The group size should be maximum of three (03) students.

Each group will be assigned a teacher as a supervisor who will handle both their theory as well lab classes.

A maximum of Four (04) projects would be assigned to one teacher.

**COMPUTER APPLICATION-SEC-4**

**PHP Programming**

**(**Credits: 02**)**

Total marks: 70 (ESE: 50; CCA: 20)

Pass marks: 28 (ESE: 20; CCA: 8)

*Objective: This course will provide the basic knowledge of PHP. It will help to learn the PHP keywords and statements, database connectivity and will also help to get a job in software industry as web developer.*

**Unit I**

PHP introduction, inventions and versions, important tools and software requirements (like Web Server, Database, Editors etc.).PHP with other technologies, scope of PHP

**Unit II**

Design and write PHP programs – Basic PHP syntax, structure and coding techniques, variables, constants, expressions and operators.

**Unit III**

Use of arrays, string, numbers, built-in functions and global variables

**Unit I**

**Handling HTML form with PHP:**

- Capturing Form Data
- GET and POST form methods
- Dealing with multi value fields
- Redirecting a form after submission

**Unit V**

**U**se PHP to send email, upload files dynamically; MySQL Database- setup, connection, insert, update, delete, display records

**References :**

1. Steven Holzner, "PHP: The Complete Reference Paperback", McGraw Hill Education (India), 2007.

2. Timothy Boronczyk, Martin E. Psinas, "PHP and MYSQL (Create-Modify-Reuse)", Wiley India Private Limited, 2008.

3. Robin Nixon, "Learning PHP, MySQL, JavaScript, CSS & HTML5", 3rd Edition Paperback, O'reilly, 2014.

4. Luke Welling, Laura Thompson, PHP and MySQL Web Development", 4th Edition, Addition Paperback, Addison-Wesley Professional,2008.

5. David Sklar, Adam Trachtenberg, "PHP Cookbook: Solutions & Examples for PHP Programmers", 2014.

**COMPUTER APPLICATION-SEC-4-LAB**

**Practical on PHP Programming**

**(**Credits: 02**)**

Total marks: 30** (CCA + ESE = 30)

Pass marks: 12 (CCA + ESE = 12)

[**For each practical course, CCA component of total marks may be included in ESE in the following items along with practical experiments etc.: Practical experiments etc. max. marks = 21; Attendance max. marks = 05; Regularity in maintenance of laboratory note book max. marks = 02 and viva-voce max. marks = 02.]

1. Write a program to find greatest of three numbers.
2. Write a program to find gross salary of a person
3. Write a program to find grade of a student given his marks.
4. Write a program to find divisor or factorial of a given number.
5. Write a program to print first ten natural numbers.
6. Write a program to print first ten even and odd numbers.
7. Implement the PHP/MySQL concepts listed in theory.
8. Implement some exercises of semester using PHP as front end.


# ASSAM UNIVERSITY, SILCHAR

## SYLLABUS UNDER

### CHOICE BASED CREDITSYSTEM

# BACHELOR IN COMPUTER APPLICATION (BCA) (HONOURS)

# Course Structure

## DETAILS OF COURSES FOR BACHELORCOMPUTER APPLICATION (Honours)

## BCA Honours

| Core Course | Credits | |
|---|---|---|
| | Theory+ Practical | Theory + Tutorial |
| **I. Core Course** | | |
| Core Course Theory (14 papers) | 14X4= 56 | 14X5=70 |
| Core Course Practical / Tutorial* (14 papers) | 14X2=28 | 14X1=14 |
| **II. Elective papers (8 papers)** | | |
| A.1. Discipline Specific Elective (4papers) | 4X4=16 | 4X5=20 |
| A.2Discipline Specific Elective Practical / Tutorial* (4papers) | 4 X 2=8 | 4X1=4 |
| B.1. Generic Elective (4papers) to be chosen from other discipline | 4X4=16 | 4X5=20 |
| B.2. Generic Elective Practical / Tutorial* (4papers) | 4 X 2=8 | 4X1=4 |
| **III. Ability Enhancement Courses** | | |
| 1. Ability Enhancement Compulsory (2 Papers) | | |
| Environmental APPLICATION | 1 X 4=4 | 1 X 4=4 |
| English/MIL Communication | 1 X 4=4 | 1 X 4=4 |
| 2. Ability Enhancement Elective (Skill Based) (2 Papers) | 2 X 2=4 | 2 X 3=6 |
| Ability Enhancement Elective (Skill Based) Practical / Tutorial* (2 Papers | 2 X 2=4 | 2 X 1=2 |
| Total Credit | 148 | 148 |

• Each credit is equivalent to 1 hour of activity per week

| | Core Course (14) | Ability Enhancement Compulsory Course (AEEC) (2) | Ability Enhancement Elective Course (AECC) (2) (Skill Based) | Elective: Discipline Specific DSE (4) | Elective:Generic (GE) (4) To be taken from other discipline |
|---|---|---|---|---|---|
| I | COMPUTER APPLICATION-C-101 | (English/MIL Communication) Environmental Science | | | GE-1 |
| | COMPUTER APPLICATION-C-102 | | | | |
| II | COMPUTER APPLICATION-C-201 | Environmental Science/ (English/MIL Communication) | | | GE-2 |
| | COMPUTER APPLICATION-C-202 | | | | |
| III | COMPUTER APPLICATION-C-301 | | COMPUTER APPLICATION-SEC-301 | | GE-3 |
| | COMPUTER APPLICATION-C-302 | | | | |
| | COMPUTER APPLICATION-C-303 | | | | |
| IV | COMPUTER APPLICATION-C-401 | | COMPUTER APPLICATION-SEC-401 | | GE-4 |
| | COMPUTER APPLICATION-C-402 | | | | |
| | COMPUTER APPLICATION-C-403 | | | | |
| V | COMPUTER APPLICATION-C-501 | | | COMPUTER APPLICATION-DSE-501 | |
| | COMPUTER APPLICATION-C-502 | | | COMPUTER APPLICATION-DSE-502 | |
| VI | COMPUTER APPLICATION-C-601 | | | COMPUTER APPLICATION-DSE-601 | |
| | COMPUTER APPLICATION-C-602 | | | COMPUTER APPLICATION-DSE-602 | |

**TDC (CBCS) Course Structure**
**BCA Honours**
**Total Course = 26 Total Credits = 148, Total Marks = 2600**

| SEM | Semester-wise distribution of papers | | | | | | Semester wise total | | |
|---|---|---|---|---|---|---|---|---|---|
| | Honours Subject | | | Elective Subject | Compulsory Subjects | | | | |
| | **CORE** Credits = 6 Marks = 100 | **DSE** Credits = 6 Marks = 100 | **SEC** Credits = 4 Marks = 100 | **GE** Credits = 6 Marks = 100 | **AECC 1** Credits = 4 Marks = 100 | **AECC 2** Credits = 4 Marks = 100 | Papers | Credits | Marks |
| I | **C-1:**Computer Fundamentals (4)<br>**C-1-Lab:**Practical on Computer Fundamentals (2)<br>**C-2:**Discrete Structures (6) | | | **GE-1:**Computer Fundamentals (4)<br>**GE-1-Lab**: Practical on Computer Fundamentals (2) | Eng. Communication / MIL Communication | | 4 | 22 | 400 |
| II | **C-3:**Introduction to Programming (4)<br>**C-3-Lab:**Practical on Programming using C and C++ (2)<br>**C-4:**Computer System Architecture (6) | | | **GE-2:**Introduction to Programming (4)<br>**GE-2-Lab:**Practical on Programming using C and C++ (2) | | Environmental Studies | 4 | 22 | 400 |
| III | **C-5:**Data Structures (4)<br>**C-5-Lab:**Practical on Data Structures (2)<br>**C-6:** Operating System (4)<br>**C-6-Lab:** Practical on UNIX/LINUX (2)<br>**C-7:**Computer Networks (4)<br>**C-7-Lab:**Practical on Network Programming (2) | | **SEC-1:**Open Source Software (2)<br>**SEC-1-Lab:** Practical on Open Source Software (2) | **GE-3:**Computer Networks (4)<br>**GE-3-Lab:**Practical on Network Programming (2) | | | 5 | 28 | 500 |
| IV | **C-8:**Design and Analysis of Algorithms (6)<br>**C-9:**Computer Graphics (4)<br>**C-9-Lab:**Practical on Graphics Programming (2)<br>**C-10:** Introduction to | | **SEC-2:**Programming in Python (2)<br>**SEC-2-Lab:** Practical on Programming in | **GE-4:**Introduction to Database Systems (4)<br>**GE-4-Lab:**Practical on | | | 5 | 28 | 500 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Database Systems (4)<br>**C-10-Lab:** Practical on Database Systems (2) | | Python (2) | Database Systems (2) | | | | | |
| V | **C-11:**Programming in Java(4)<br>**C-11-Lab:**Practical on Programming in Java (2) | **DSE-1:**Numerical & Statistical Methods (4)<br>**DSE-1-Lab:**Practical on Numerical & Statistical Methods (2) | | | | | 4 | 24 | 400 |
| | **C-12:**Management Information System (6) | **DSE-2:**Internet Technologies (4)<br>**DSE-2-Lab**: Practical on Internet Technologies (2) | | | | | | | |
| VI | **C-13:**Fundamentals of E-commerce (6)<br>**C-14:**Software Engineering (6) | **DSE-3:**PHP Programming (4)<br>**DSE-3-Lab:**Practical on PHP Programming (2) | | | | | 4 | 24 | 400 |
| | | **DSE-4:**Project work/ Dissertation (6) | | | | | | | |
| **Total** | **14** | **4** | **2** | **4** | **1** | **1** | **26** | **148** | **2600** |

**N.B: Compulsory papers:**

i. AECC1 – English Communication/MIL

ii. AECC2 – Environment Studies

**BCA Honours students can opt for Four papers of any one discipline listed below (GE 1 to GE4)**

**i.** Economics**ii**. BBA**iii**. Commerce**iv**. All Science subjects

**CCA** – Continuous and Comprehensive Assessment (Internal Assessment), **ESE** – End Semester Examinations, **FM** – Full Marks, **PM** – Pass Marks

## COMPUTER APPLICATION- C-1

### Computer Fundamentals

**(**Credits: 04**)**

Total marks: 70 (ESE: 50; CCA: 20)

Pass marks: 28 (ESE: 20; CCA: 8)

*Objective: Computer Fundamentals is a course that's designed specifically for those who are completely new to computers. This syllabus has been prepared for the beginners as well as advanced learners who want to deal with computers. After completing these contents you will find yourself at a moderate level of expertise in knowledge of computer basics from where you can take yourself to next levels.*

**Unit 1:** Introduction: Introduction to computer system, uses, types. Data Representation: Number systems and character representation, binary arithmetic Human

**Unit 2:** Computer Interface: Types of software, Operating system as user interface, utility programs. Devices: Input and output devices (with connections and practical demo), keyboard, mouse, joystick, scanner, OCR, OMR, bar code reader, web camera, monitor, printer, plotter.

**Unit 3:** Memory: Primary, secondary, auxiliary memory, RAM, ROM, cache memory, hard disks, optical disks.

**Unit 4:** Computer Organization and Architecture: C.P.U., registers, system bus, main memory unit, cache memory, Inside a computer, SMPS, Motherboard, Ports and Interfaces, expansion cards, ribbon cables, memory chips, processors.Overview of Emerging Technologies: Bluetooth, cloud computing, big data, data mining, mobile computing and embedded systems.

**Unit 5:** Use of Computers in Education and Research: Data analysis, Heterogeneous storage, e-Library, Google Scholar, Domain specific packages such as SPSS, Mathematica etc.

**Reference Books:**


1. A. Goel, Computer Fundamentals, Pearson Education, 2010.
2. P. Aksoy, L. DeNardis, Introduction to Information Technology, Cengage Learning, 2006
3. P. K.Sinha, P. Sinha, Fundamentals of Computers, BPB Publishers, 2007

**COMPUTER APPLICATION-C-1-LAB**

**Practical on Computer Fundamentals**

**(**Credits: 02**)**

Total marks: 30[**] (CCA + ESE = 30)

Pass marks: 12 (CCA + ESE = 12)

[[**]*For each practical course, CCA component of total marks may be included in ESE in the following items along with practical experiments etc.: Practical experiments etc. max. marks = 21; Attendance max. marks = 05; Regularity in maintenance of laboratory note book max. marks = 02 and viva-voce max. marks = 02*.]

**Practical:**

*Practical exercises based on Open Office tools using document preparation and spreadsheet handling packages.*

The practical assignment must include connecting parts of a computer and assembling it to an extent, media formatting and installation of some software.

Practical exercises based on Open Office tools using document preparation and spreadsheet handling packages.

**Text Editor**

1. Prepare **a grocery list** having four columns (Serial number, The name of the product, quantity and price) for the month of April, 06.

    - Font specifications for Title (Grocery List): 14-point Arial font in bold and italics.
    - The headings of the columns should be in 12-point and bold.
    - The rest of the document should be in 10-point Times New Roman.
    - Leave a gap of 12-points after the title.

2. Create a **telephone directory**.
    - The heading should be 16-point Arial Font in bold
    - The rest of the document should use 10-point font size
    - Other headings should use 10-point Courier New Font.
    - The footer should show the page number as well as the date last updated.

3. Design a **time-table form** for your college.
    - The first line should mention the name of the college in 16-point Arial Font and should be bold.
    - The second line should give the course name/teacher's name and the department in 14-point Arial.
    - Leave a gap of 12-points.
    - The rest of the document should use 10-point Times New Roman font.
    - The footer should contain your specifications as the designer and date of creation.

4. BPB Publications plans to release a new book designed as per your syllabus. Design the **first**
**page of the book** as per the given specifications.
   - The title of the book should appear in bold using 20-point Arial font.
   - The name of the author and his qualifications should be in the center of the page in 16-point Arial font.
   - At the bottom of the document should be the name of the publisher and address in 16-point Times New Roman.
   - The details of the offices of the publisher (only location) should appear in the footer.

5. Create the following one page documents.
   a. Compose a note inviting friends to a get-together at your house, Including a list of things to bring with them.
   b. Design a certificate in landscape orientation with a border around the document.
   c. Design a Garage Sale sign.
   d. Make a sign outlining your rules for your bedroom at home, using a numbered list.

6. Create the following documents:

   (a) A newsletter with a headline and 2 columns in portrait orientation, including at least one image surrounded by text.
   (b) Use a newsletter format to promote upcoming projects or events in your classroom or college.

7. Convert following text to a table, using comma as delimiter

   Type the following as shown (do not bold).
   **Color, Style, Item**
   **Blue, A980, Van**
   **Red, X023, Car**
   **Green, YL724, Truck**
   **Name, Age, Sex**
   **Bob, 23, M**
   **Linda, 46, F**
   **Tom, 29, M**

9. Enter the following data into a table given on the next page.

| **Salesperson** | **Dolls** | **Trucks** | **Puzzles** |
|---|---|---|---|
| Kennedy, Sally | 1327 | 1423 | 1193 |

| | | | |
|---|---|---|---|
| White, Pete | 1421 | 3863 | 2934 |
| Pillar, James | 5214 | 3247 | 5467 |
| York, George | 2190 | 1278 | 1928 |
| Banks, Jennifer | 1201 | 2528 | 1203 |
| Atwater, Kelly | 4098 | 3079 | 2067 |

Add a column Region (values: S, N, N,S,S,S) between the Salesperson and Dolls columns to the given table Sort your table data by Region and within Region by Salesperson in ascending order:

In this exercise, you will add a new row to your table, place the word "Total" at the bottom of the Salesperson column, and sum the Dolls, Trucks, and Puzzles columns.

10. Wrapping of text around the image.

11. Create your resume by incorporating most of the options learned till now.
12. Following features of menu option must be covered

| | |
|---|---|
| FILE | Complete menu |
| EDIT | Complete menu |
| VIEW | Complete menu |
| INSERT | Complete menu |
| FORMAT | Complete menu |
| TABLE | Complete menu |
| WINDOW | Complete menu |
| HELP | Complete menu |
| TOOLS | All options except Online collaboration, Tools on Macro, Templates |

**Spreadsheet**

1. Enter the Following data in Excel Sheet

**REGIONAL SALES PROJECTION**

| State | Qtr1 | Qtr2 | Qtr3 | QTR4 | Qtr Total | Rate Amount |
|---|---|---|---|---|---|---|

| | | | | | |
|---|---|---|---|---|---|
| Delhi | 2020 | 2400 | 2100 | 3000 | 15 |
| Punjab | 1100 | 1300 | 1500 | 1400 | 20 |
| U.P. | 3000 | 3200 | 2600 | 2800 | 17 |
| Harayana | 1800 | 2000 | 2200 | 2700 | 15 |
| Rajasthan | 2100 | 2000 | 1800 | 2200 | 20 |

**TOTALAVERAGE**

(a) Apply Formatting as follow:

I. Title in TIMES NEW ROMAN

ii. Font Size - 14

iii. Remaining text - ARIAL, Font Size -10

iv. State names and Qtr. Heading Bold, Italic with Gray Fill Color.

v. Numbers in two decimal places.

vi. Qtr. Heading in center Alignment.

vii. Apply Border to whole data.

(b) Calculate State and Qtr. Total

(c) Calculate Average for each quarter

(d) Calculate Amount = Rate * Total.

2. Given the following worksheet

| | A | B | C | D |
|---|---|---|---|---|
| 1 | Roll No. | Name | Marks | Grade |
| 2 | 1001 | Sachin | 99 | |
| 3 | 1002 | Sehwag | 65 | |
| 4 | 1003 | Rahul | 41 | |
| 5 | 1004 | Sourav | 89 | |
| 6 | 1005 | HarBhajan | 56 | |

Calculate the grade of these students on the basis of following guidelines:

| If Marks | Then Grade |
|---|---|
| >= 80 | A+ |
| >= 60 < 80 | A |
| >= 50 < 60 | B |
| < 50 | F |

3. Given the following worksheet

| | A | B | C | D | E | F | G |
|---|---|---|---|---|---|---|---|
| 1 | **Salesman** | | | **Sales in (Rs.)** | | | |
| 2 | No. | Qtr1 | Qtr2 | Qtr3 | Qtr4 | Total | Commission |
| 3 | S001 | 5000 | 8500 | 12000 | 9000 | | |
| 4 | S002 | 7000 | 4000 | 7500 | 11000 | | |
| 5 | S003 | 4000 | 9000 | 6500 | 8200 | | |
| 6 | S004 | 5500 | 6900 | 4500 | 10500 | | |
| 7 | S005 | 7400 | 8500 | 9200 | 8300 | | |

| | | | | | |
|---|---|---|---|---|---|
| 8 | S006 | 5300 | 7600 | 9800 | 6100 |

Calculate the commission earned by the salesmen on the basis of following Candidates:

| **If Total Sales** | **Commission** |
|---|---|
| < 20000 | 0% of sales |
| > 20000 and < 25000 | 4% of sales |
| > 25000 and < 30000 | 5.5% of sales |
| > 30000 and < 35000 | 8% of sales |
| >= 35000 | 11% of sales |

The total sales is sum of sales of all the four quarters.

4. A company XYZ Ltd. pays a monthly salary to its employees which consists of basic salary, allowances & deductions. The details of allowances and deductions are as follows:

**Allowances**

- HRA Dependent on Basic
  30% of Basic if Basic <=1000
  25% of Basic if Basic>1000 & Basic<=3000
  20% of Basic if Basic >3000
- DA Fixed for all employees, 30% of Basic
- Conveyance Allowance Rs. 50/- if Basic is
  <=1000Rs. 75/- if Basic >1000 &
  Basic<=2000
  Rs. 100 if Basic >2000
- Entertainment Allowance NIL if Basic is <=1000
  Rs. 100/- if Basic > 1000

**Deductions**

- Provident Fund 6% of Basic
- Group Insurance Premium Rs. 40/- if Basic is <=1500
  Rs. 60/- if Basic > 1500 & Basic<=3000
  Rs. 80/- if Basic >3000

Calculate the following:

Gross Salary = Basic + HRA + DA + Conveyance + Entertainment

Total deduction = Provident Fund + Group Insurance Premium

Net Salary = Gross Salary – Total Deduction

5. Create Payment Table for a fixed Principal amount, variable rate of interests and time in the format below:

| No. of Instalments | 5% | 6% | 7% | 8% | 9% |
|---|---|---|---|---|---|
| 1 | XX | XX | XX | XX | XX |
| 2 | XX | XX | XX | XX | XX |
| 3 | XX | XX | XX | XX | XX |
| 4 | XX | XX | XX | XX | XX |

6. Use an array formula to calculate Simple Interest for given principal amounts given the rate of Interest and time

| | |
|---|---|
| Rate of Interest | 8% |
| Time | 5 Years |
| Principal | Simple Interest |
| 1000 | ? |
| 18000 | ? |
| 5200 | ? |

7. The following table gives year wise sale figure of five salesmen in Rs.

| **Salesman** | **2000** | **2001** | **2002** | **2003** |
|---|---|---|---|---|
| S1 | 10000 | 12000 | 20000 | 50000 |
| S2 | 15000 | 18000 | 50000 | 60000 |
| S3 | 20000 | 22000 | 70000 | 70000 |
| S4 | 30000 | 30000 | 100000 | 80000 |
| S5 | 40000 | 45000 | 125000 | 90000 |

(*a*) Calculate total sale year wise.
(*b*) Calculate the net sale made by each salesman
(*c*) Calculate the maximum sale made by the salesman
(d) Calculate the commission for each salesman under the condition.
(*i*) If total sales >4,00,000 give 5% commission on total sale made by the salesman.
(*ii*) Otherwise give 2% commission.
(*e*) Draw a bar graph representing the sale made by each salesman.
(*f*) Draw a pie graph representing the sale made by salesman in 2000.

8. Enter the following data in Excel Sheet

**PERSONAL BUDGET FOR FIRST QUARTER**

**Monthly Income (Net): 1,475**

| **EXPENSES** | **JAN** | **FEB** | **MARCH** | **QUARTER TOTAL** | **QUARTER AVERAGE** |
|---|---|---|---|---|---|
| Rent600.00 | 600.00 | 600.00 | | | |
| Telephone | 48.25 | 43.50 | 60.00 | | |
| Utilities | 67.27 | 110.00 | 70.00 | | |
| Credit Card | 200.00 | 110.00 | 70.00 | | |
| Oil | 100.00 | 150.00 | 90.00 | | |
| AV to Insurance | 150.00 | | | | |
| Cable TV | 40.75 | 40.75 | 40.75 | | |
| **Monthly Total** | | | | | |

(a) Calculate Quarter total and Quarter average.

(b) Calculate Monthly total.

(c) Surplus = Monthly income - Monthly total.

(d) What would be total surplus if monthly income is 1500.

(e) How much does telephone expense for March differ from quarter average.

(f) Create a 3D column graph for telephone and utilities.

(g) Create a pie chart for monthly expenses.

**9.** Enter the following data in Excel Sheet

**TOTAL REVENUE EARNED FOR SAM'S BOOKSTALL**

| **Publisher name** | **1997** | **1998** | **1999** | **2000** | **total** |
|---|---|---|---|---|---|
| A | Rs. 1,000.00 | Rs. 1100.00 | Rs. 1,300.00 | Rs. 800.00 | |
| B | Rs. 1,500.00 | Rs. 700.00 | Rs. 1,000.00 | Rs. 2,000.00 | |
| C | Rs. 700.00 | Rs. 900.00 | Rs. 1,500.00 | Rs. 600.00 | |
| D | Rs. 1,200.00 | Rs. 500.00 | Rs. 200.00 | Rs. 1,100.00 | |
| E | Rs 800.00 | Rs. 1,000.00 | Rs. 3,000.00 | Rs. 560.00 | |

(a) Compute the total revenue earned.

(b) Plot the line chart to compare the revenue of all publisher for 4 years.

(b) Chart Title should be 'Total Revenue of sam's Bookstall (1997-2000)'

(c) Give appropriate categories and value axis title.

10. Generate 25 random numbers between 0 & 100 and find their sum, average and count. How many no. are in range 50-60

COMPUTER APPLICATION- C-2

**Discrete Structures**

(Credits: 06)

Total marks: 100 (ESE: 70; CCA: 30)

Pass marks: 40 (ESE: 28; CCA: 12)

**Unit I**

Mathematical Logic: Statements and Notations, Connectives, Normal forms, Theory of inference for the statement calculus, the Predicate calculus, Inference theory of the predicate calculus.

**Unit II**

Set Theory: Basic concept of set theory, Relations and ordering, function. Algebraic Structures: Grammars and languages, Polish Expressions and their Compilation.

**Unit III**

Lattices and Boolean algebra with applications: Lattices and Partially Ordered Sets, Boolean algebra, Boolean Functions, Representation and Minimization of Boolean functions, Design Examples using Boolean algebra.

**Unit IV**

Graph theory with applications: Basic concepts of Graph Theory Storage Representation and Manipulation of Graphs, Incidence and degree; Isomorphism; Sub graphs and Union of graphs; Connectedness; Walks, Paths and Circuits; Components and Connectedness algorithms; Shortest Path Algorithms, Eulerian graph, Hamiltonian graph - necessary and sufficient conditions; Traveling salesman; Bipartite graph.

**Unit V**

Tree : Properties of trees; Pedant vertices in a tree; Center of a tree; Rooted binary trees; Spanning trees - Spanning tree algorithms, minimum cost spanning tree; Fundamental circuits; Spanning trees of a weighted graph; cut-sets and cut-vertices; Fundamental cut-sets; Connectivity and separativity.

**Text Books**


1. Swapan K Sarkar, A Textbook of Discrete Mathematics, S. Chand Publication.
2. Deo, N., Graph Theory with Applications to Engineering and Computer Science.


**Reference Books**


1. C. L. Liu, Introduction to Discrete Mathematics.
2. JP Trembly and R. Manohar, Discrete Mathematical structures with with Applications. To Computer Science, McGraw-Hill Pub.
3. Lipschutz Seymour, Discrete Mathematics, Tata Mcgraw Hill Education Private Limited.
4. Harary, Graph Theory, PHI (EEE).

**COMPUTER APPLICATION-GE-101**

**Computer Fundamentals**

**(**Credits: 04**)**

Full marks: 100 (External: 70; Sessional: 30)

Pass marks: 40 (External: 28; Sessional: 12)

*Objective: Computer Fundamentals is a course that's designed specifically for those who are completely new to computers. This syllabus has been prepared for the beginners as well as advanced learners who want to deal with computers. After completing these contents you will find yourself at a moderate level of expertise in knowledge of computer basics from where you can take yourself to next levels.*

**Unit 1:** Introduction: Introduction to computer system, uses, types. Data Representation: Number systems and character representation, binary arithmetic Human

**Unit 2:** Computer Interface: Types of software, Operating system as user interface, utility programs. Devices: Input and output devices (with connections and practical demo), keyboard, mouse, joystick, scanner, OCR, OMR, bar code reader, web camera, monitor, printer, plotter .

**Unit 3:** Memory: Primary, secondary, auxiliary memory, RAM, ROM, cache memory, hard disks, optical disks.

**Unit 4:** Computer Organization and Architecture: C.P.U., registers, system bus, main memory unit, cache memory, Inside a computer, SMPS, Motherboard, Ports and Interfaces, expansion cards, ribbon cables, memory chips, processors.Overview of Emerging Technologies: Bluetooth, cloud computing, big data, data mining, mobile computing and embedded systems.

**Unit 5:** Use of Computers in Education and Research: Data analysis, Heterogeneous storage, e-Library, Google Scholar, Domain specific packages such as SPSS, Mathematica etc.

**Reference Books:**


1. **A. Goel, Computer Fundamentals, Pearson Education, 2010.**
2. **P. Aksoy, L. DeNardis, Introduction to Information Technology, Cengage Learning, 2006**
3. **P. K.Sinha, P. Sinha, Fundamentals of Computers, BPB Publishers, 2007**

**COMPUTER APPLICATION-GE-101-LAB**

**Practical on Computer Fundamentals**

**(**Credits: 02**)**

Full marks: 50 (External: 35; Sessional: 15)

Pass marks: 20 (External:14 ; Sessional: 6)

**Practical:**

*Practical exercises based on Open Office tools using document preparation and spreadsheet handling packages.*

The practical assignment must include connecting parts of a computer and assembling it to an extent, media formatting and installation of some software.

Practical exercises based on Open Office tools using document preparation and spreadsheet handling packages.

**Text Editor**

1. Prepare **a grocery list** having four columns (Serial number, The name of the product, quantity and price) for the month of April, 06.

    - Font specifications for Title (Grocery List): 14-point Arial font in bold and italics.
    - The headings of the columns should be in 12-point and bold.
    - The rest of the document should be in 10-point Times New Roman.
    - Leave a gap of 12-points after the title.

2. Create a **telephone directory**.
    - The heading should be 16-point Arial Font in bold
    - The rest of the document should use 10-point font size
    - Other headings should use 10-point Courier New Font.
    - The footer should show the page number as well as the date last updated.

3. Design a **time-table form** for your college.
    - The first line should mention the name of the college in 16-point Arial Font and should be bold.
    - The second line should give the course name/teacher's name and the department in 14-point Arial.
    - Leave a gap of 12-points.
    - The rest of the document should use 10-point Times New Roman font.
    - The footer should contain your specifications as the designer and date of creation.

4. BPB Publications plans to release a new book designed as per your syllabus. Design the **first**
**page of the book** as per the given specifications.
    - The title of the book should appear in bold using 20-point Arial font.

- The name of the author and his qualifications should be in the center of the page in 16-point Arial font.
- At the bottom of the document should be the name of the publisher and address in 16-point Times New Roman.
- The details of the offices of the publisher (only location) should appear in the footer.

5. Create the following one page documents.
   a. Compose a note inviting friends to a get-together at your house, Including a list of things to bring with them.
   b. Design a certificate in landscape orientation with a border around the document.
   c. Design a Garage Sale sign.
   d. Make a sign outlining your rules for your bedroom at home, using a numbered list.

6. Create the following documents:

   (a) A newsletter with a headline and 2 columns in portrait orientation, including at least one image surrounded by text.
   (b) Use a newsletter format to promote upcoming projects or events in your classroom or college.

7. Convert following text to a table, using comma as delimiter

   Type the following as shown (do not bold).
   **Color, Style, Item**
   **Blue, A980, Van**
   **Red, X023, Car**
   **Green, YL724, Truck**
   **Name, Age, Sex**
   **Bob, 23, M**
   **Linda, 46, F**
   **Tom, 29, M**

9. Enter the following data into a table given on the next page.

| Salesperson | Dolls | Trucks | Puzzles |
|---|---|---|---|
| Kennedy, Sally | 1327 | 1423 | 1193 |
| White, Pete | 1421 | 3863 | 2934 |
| Pillar, James | 5214 | 3247 | 5467 |

| | | | |
|---|---|---|---|
| York, George | 2190 | 1278 | 1928 |
| Banks, Jennifer | 1201 | 2528 | 1203 |
| Atwater, Kelly | 4098 | 3079 | 2067 |

Add a column Region (values: S, N, N,S,S,S) between the Salesperson and Dolls columns to the given table Sort your table data by Region and within Region by Salesperson in ascending order:

In this exercise, you will add a new row to your table, place the word "Total" at the bottom of the Salesperson column, and sum the Dolls, Trucks, and Puzzles columns.

10. Wrapping of text around the image.

11. Create your resume by incorporating most of the options learned till now.
12. Following features of menu option must be covered

| | |
|---|---|
| FILE | Complete menu |
| EDIT | Complete menu |
| VIEW | Complete menu |
| INSERT | Complete menu |
| FORMAT | Complete menu |
| TABLE | Complete menu |
| WINDOW | Complete menu |
| HELP | Complete menu |
| TOOLS | All options except Online collaboration, Tools on Macro, Templates |

**Spreadsheet**

1. Enter the Following data in Excel Sheet

**REGIONAL SALES PROJECTION**

| State | Qtr1 | Qtr2 | Qtr3 | QTR4 | Qtr Total | Rate Amount |
|---|---|---|---|---|---|---|
| Delhi | 2020 | 2400 | 2100 | 3000 | 15 | |
| Punjab | 1100 | 1300 | 1500 | 1400 | 20 | |
| U.P. | 3000 | 3200 | 2600 | 2800 | 17 | |
| Harayana | 1800 | 2000 | 2200 | 2700 | 15 | |
| Rajasthan | 2100 | 2000 | 1800 | 2200 | 20 | |

**TOTALAVERAGE**

(a) Apply Formatting as follow:

I. Title in TIMES NEW ROMAN

ii. Font Size - 14

iii. Remaining text - ARIAL, Font Size -10

iv. State names and Qtr. Heading Bold, Italic with Gray Fill Color.

v. Numbers in two decimal places.

vi. Qtr. Heading in center Alignment.

vii. Apply Border to whole data.

(b) Calculate State and Qtr. Total

(c) Calculate Average for each quarter

(d) Calculate Amount = Rate * Total.

2. Given the following worksheet

| | A | B | C | D |
|---|---|---|---|---|
| 1 | Roll No. | Name | Marks | Grade |
| 2 | 1001 | Sachin | 99 | |
| 3 | 1002 | Sehwag | 65 | |
| 4 | 1003 | Rahul | 41 | |
| 5 | 1004 | Sourav | 89 | |
| 6 | 1005 | HarBhajan | 56 | |

Calculate the grade of these students on the basis of following guidelines:

| If Marks | Then Grade |
|---|---|
| >= 80 | A+ |
| >= 60 < 80 | A |
| >= 50 < 60 | B |
| < 50 | F |

3. Given the following worksheet

| | A | B | C | D | E | F | G |
|---|---|---|---|---|---|---|---|
| 1 | **Salesman** | | | **Sales in (Rs.)** | | | |
| 2 | No. | Qtr1 | Qtr2 | Qtr3 | Qtr4 | Total | Commission |
| 3 | S001 | 5000 | 8500 | 12000 | 9000 | | |
| 4 | S002 | 7000 | 4000 | 7500 | 11000 | | |
| 5 | S003 | 4000 | 9000 | 6500 | 8200 | | |
| 6 | S004 | 5500 | 6900 | 4500 | 10500 | | |
| 7 | S005 | 7400 | 8500 | 9200 | 8300 | | |
| 8 | S006 | 5300 | 7600 | 9800 | 6100 | | |

Calculate the commission earned by the salesmen on the basis of following Candidates:

| **If Total Sales** | **Commission** |
|---|---|

| | |
|---|---|
| < 20000 | 0% of sales |
| > 20000 and < 25000 | 4% of sales |
| > 25000 and < 30000 | 5.5% of sales |
| > 30000 and < 35000 | 8% of sales |
| >= 35000 | 11% of sales |

The total sales is sum of sales of all the four quarters.

4. A company XYZ Ltd. pays a monthly salary to its employees which consists of basic salary, allowances & deductions. The details of allowances and deductions are as follows:

**Allowances**

- HRA Dependent on Basic

  30% of Basic if Basic <=1000

  25% of Basic if Basic>1000 & Basic<=3000

  20% of Basic if Basic >3000
- DA Fixed for all employees, 30% of Basic
- Conveyance Allowance Rs. 50/- if Basic is

  <=1000Rs. 75/- if Basic >1000 &

  Basic<=2000

  Rs. 100 if Basic >2000
- Entertainment Allowance NIL if Basic is <=1000

  Rs. 100/- if Basic > 1000

**Deductions**

- Provident Fund 6% of Basic
- Group Insurance Premium Rs. 40/- if Basic is <=1500

  Rs. 60/- if Basic > 1500 & Basic<=3000

  Rs. 80/- if Basic >3000

Calculate the following:

Gross Salary = Basic + HRA + DA + Conveyance + Entertainment

Total deduction = Provident Fund + Group Insurance Premium

Net Salary = Gross Salary – Total Deduction

5. Create Payment Table for a fixed Principal amount, variable rate of interests and time in the format below:

| No. of Instalments | 5% | 6% | 7% | 8% | 9% |
|---|---|---|---|---|---|
| 1 | XX | XX | XX | XX | XX |
| 2 | XX | XX | XX | XX | XX |
| 3 | XX | XX | XX | XX | XX |
| 4 | XX | XX | XX | XX | XX |

6. Use an array formula to calculate Simple Interest for given principal amounts given the rate of Interest and time

Rate of Interest 8%

| Time | 5 Years |
|---|---|
| Principal | Simple Interest |
| 1000 | ? |
| 18000 | ? |
| 5200 | ? |

7. The following table gives year wise sale figure of five salesmen in Rs.

| **Salesman** | **2000** | **2001** | **2002** | **2003** |
|---|---|---|---|---|
| S1 | 10000 | 12000 | 20000 | 50000 |
| S2 | 15000 | 18000 | 50000 | 60000 |
| S3 | 20000 | 22000 | 70000 | 70000 |
| S4 | 30000 | 30000 | 100000 | 80000 |
| S5 | 40000 | 45000 | 125000 | 90000 |

(*a*) Calculate total sale year wise.

(*b*) Calculate the net sale made by each salesman

(*c*) Calculate the maximum sale made by the salesman

(d) Calculate the commission for each salesman under the condition.

(*i*) If total sales >4,00,000 give 5% commission on total sale made by the salesman.

(*ii*) Otherwise give 2% commission.

(*e*) Draw a bar graph representing the sale made by each salesman.

(*f*) Draw a pie graph representing the sale made by salesman in 2000.

8. Enter the following data in Excel Sheet

**PERSONAL BUDGET FOR FIRST QUARTER**

**Monthly Income (Net): 1,475**

| **EXPENSES** | **JAN** | **FEB** | **MARCH** | **QUARTER TOTAL** | **QUARTER AVERAGE** |
|---|---|---|---|---|---|
| Rent600.00 | 600.00 | 600.00 | | | |
| Telephone | 48.25 | 43.50 | 60.00 | | |
| Utilities | 67.27 | 110.00 | 70.00 | | |
| Credit Card | 200.00 | 110.00 | 70.00 | | |
| Oil | 100.00 | 150.00 | 90.00 | | |
| AV to Insurance | 150.00 | | | | |
| Cable TV | 40.75 | 40.75 | 40.75 | | |
| **Monthly Total** | | | | | |

(a) Calculate Quarter total and Quarter average.

(b) Calculate Monthly total.

(c) Surplus = Monthly income - Monthly total.

(d) What would be total surplus if monthly income is 1500.

(e) How much does telephone expense for March differ from quarter average.

(f) Create a 3D column graph for telephone and utilities.

(g) Create a pie chart for monthly expenses.

**9.** Enter the following data in Excel Sheet

**TOTAL REVENUE EARNED FOR SAM'S BOOKSTALL**

| **Publisher name** | **1997** | **1998** | **1999** | **2000** | **total** |
|---|---|---|---|---|---|
| A | Rs. 1,000.00 | Rs. 1100.00 | Rs. 1,300.00 | Rs. 800.00 | |
| B | Rs. 1,500.00 | Rs. 700.00 | Rs. 1,000.00 | Rs. 2,000.00 | |
| C | Rs. 700.00 | Rs. 900.00 | Rs. 1,500.00 | Rs. 600.00 | |
| D | Rs. 1,200.00 | Rs. 500.00 | Rs. 200.00 | Rs. 1,100.00 | |
| E | Rs 800.00 | Rs. 1,000.00 | Rs. 3,000.00 | Rs. 560.00 | |

(a) Compute the total revenue earned.

(b) Plot the line chart to compare the revenue of all publisher for 4 years.

(b) Chart Title should be 'Total Revenue of sam's Bookstall (1997-2000)'

(c) Give appropriate categories and value axis title.

10. Generate 25 random numbers between 0 & 100 and find their sum, average and count. How many no. are in range 50-60

**COMPUTER APPLICATION-C-3**
**INTRODUCTION TO PROGRAMMING**

(Credits: 04)

Total marks: 70 (ESE: 50; CCA: 20)
Pass marks: 28 (ESE: 20; Sessional: 8)

## Unit I

**Introduction to C and C++**
History of C and C++, Overview of Procedural Programming and Object-Orientation Programming, Using main() function, Compiling and Executing Simple Programs in C++.

**Data Types, Variables, Constants, Operators and Basic I/O**
Declaring, Defining and Initializing Variables, Scope of Variables, Using Named Constants, Keywords, Data Types, Casting of Data Types, Operators (Arithmetic, Logical and Bitwise), Using Comments in programs, Character I/O (getc, getchar, putc, putcharetc), Formatted and Console I/O (printf(), scanf(), cin, cout), Using Basic Header Files (stdio.h, iostream.h, conio.hetc).

## Unit II

**Expressions, Conditional Statements and Iterative Statements:** Simple Expressions in C++ (including Unary Operator Expressions, Binary Operator Expressions), Understanding Operators Precedence in Expressions, Conditional Statements (if construct, switch-case construct), Understanding syntax and utility of Iterative Statements (while, do-while, and for loops), Use of break and continue in Loops, Using Nested Statements (Conditional as well as Iterative)

## Unit III

**Functions and Arrays:** Utility of functions, Call by Value, Call by Reference, Functions returning value, Void functions, Inline Functions, Return data type of functions, Functions parameters, Differentiating between Declaration and Definition of Functions, Command Line Arguments/Parameters in Functions, Functions with variable number of Arguments.
Creating and Using One Dimensional Arrays ( Declaring and Defining an Array, Initializing an Array, Accessing individual elements in an Array, Manipulating array elements using loops), Use Various types of arrays (integer, float and character arrays / Strings) Two-dimensional Arrays (Declaring, Defining and Initializing Two Dimensional Array, Working with Rows and Columns), Introduction to Multi-dimensional arrays

## Unit IV

**Derived Data Types (Structures and Unions):** Understanding utility of structures and unions, Declaring, initializing and using simple structures and unions, Manipulating individual members of structures and unions, Array of Structures, Individual data members as structures, Passing and returning structures from functions, Structure with union as members, Union with structures as members.

**File I/O, Preprocessor Directives**
Opening and closing a file (use of fstream header file, ifstream, ofstream and fstream classes), Reading and writing Text Files, Using put(), get(), read() and write() functions, Random access in files, Understanding the Preprocessor Directives (#include, #define, #error, #if, #else, #elif, #endif, #ifdef, #ifndef and #undef), Macros.

## Unit V

**Using Classes in C++**
Principles of Object-Oriented Programming, Defining & Using Classes, Class Constructors, Constructor Overloading, Function overloading in classes, Class Variables &Functions, Objects as parameters, specifying the Protected and Private Access, Copy Constructors, Overview of Template classes and their use.
**Inheritance and Polymorphism**
Introduction to Inheritance and Polymorphism

**Reference Books:**
1. HerbtzSchildt, "C++: The Complete Reference", Fourth Edition, McGraw Hill.2003
2. BjarneStroustrup, "The C++ Programming Language", 4th Edition, Addison-Wesley , 2013.
3. BjarneStroustroup, "Programming -- Principles and Practice using C++", 2nd Edition, Addison-Wesley 2014.
4. E Balaguruswamy, "Object Oriented Programming with C++", Tata McGraw-Hill Education, 2008.
5. Paul Deitel, Harvey Deitel, "C++ How to Program", 8th Edition, Prentice Hall, 2011.
6. John R. Hubbard, "Programming with C++", Schaum's Series, 2nd Edition, 2000.
7. Andrew Koeni, Barbara, E. Moo, "Accelerated C++", Published by Addison-Wesley , 2000.
8. Scott Meyers, "Effective C++", 3rd Edition, Published by Addison-Wesley, 2005.
9. Harry, H. Chaudhary, "Head First C++ Programming: The Definitive Beginner's Guide", First Create space Inc, O-D Publishing, LLC USA.2014
10. Walter Savitch, "Problem Solving with C++", Pearson Education, 2007.
11. Stanley B. Lippman, JoseeLajoie, Barbara E. Moo, "C++ Primer", Published by Addison-Wesley, 5th Edition, 2012

## COMPUTER APPLICATION-C-3-LAB
## Practical on Introduction to C/C++ Programming

(Credits: 02)
Total marks: 30** (CCA + ESE = 30)
Pass marks: 12 (CCA + ESE = 12)

[**For each practical course, CCA component of total marks may be included in ESE in the following items along with practical experiments etc.: Practical experiments etc. max. marks = 21; Attendance max. marks = 05; Regularity in maintenance of laboratory note book max. marks = 02 and viva-voce max. marks = 02.]

1. WAP to print the sum and product of digits of an integer.
2. WAP to reverse a number.
3. WAP to compute the sum of the first n terms of the following series
S = 1+1/2+1/3+1/4+.....
4. WAP to compute the sum of the first n terms of the following series
S =1-2+3-4+5.....
5. Write a function that checks whether a given string is Palindrome or not. Use this function to find whether the string entered by user is Palindrome or not.
6. Write a function to find whether a given no. is prime or not. Use the same to generate the prime numbers less than 100.
7. WAP to compute the factors of a given number.

8. Write a macro that swaps two numbers. WAP to use it.
9. WAP to print a triangle of stars as follows (take number of lines from user):

```
        *
       ***
      *****
     *******
    *********
```

10. WAP to perform following actions on an array entered by the user:
    i) Print the even-valued elements
    ii) Print the odd-valued elements
    iii) Calculate and print the sum and average of the elements of array
    iv) Print the maximum and minimum element of array
    v) Remove the duplicates from the array
    vi) Print the array in reverse order The program should present a menu to the user and ask for one of the options. The menu should also include options to re-enter array and to quit the program.
11. WAP that prints a table indicating the number of occurrences of each alphabet in the text entered as command line arguments.
12. Write a program that swaps two numbers using pointers.
13. Write a program in which a function is passed address of two variables and then alter its contents.
14. Write a program which takes the radius of a circle as input from the user, passes it to another function that computes the area and the circumference of the circle and displays the value of area and circumference from the main() function.
15. Write a program to find sum of n elements entered by the user. To write this program, allocate memory dynamically using malloc() / calloc() functions or new operator.
16. Write a menu driven program to perform following operations on strings:13
    a) Show address of each character in string
    b) Concatenate two strings without using strcat function.
    c) Concatenate two strings using strcat function.
    d) Compare two strings
    e) Calculate length of the string (use pointers)
    f) Convert all lowercase characters to uppercase
    g) Convert all uppercase characters to lowercase
    h) Calculate number of vowels
    i) Reverse the string
17. Given two ordered arrays of integers, write a program to merge the two-arrays to get an ordered array.
18. WAP to display Fibonacci series (i)using recursion, (ii) using iteration
19. WAP to calculate Factorial of a number (i)using recursion, (ii) using iteration
20. WAP to calculate GCD of two numbers (i) with recursion (ii) without recursion.
21. Create Matrix class using templates. Write a menu-driven program to perform following Matrix Operations (2-D array implementation):
    a) Sum b) Difference c) Product d) Transpose
22. Create the Person class. Create some objects of this class (by taking information from the user). Inherit the class Person to create two classes Teacher and Student class. Maintain the respective information in the classes and create, display and delete objects of these two classes (Use Runtime Polymorphism).
23. Create a class Triangle. Include overloaded functions for calculating area. Overload assignment operator and equality operator.

24. Create a class Box containing length, breath and height. Include following methods in it:
    a) Calculate surface Area
    b) Calculate Volume
    c) Increment, Overload ++ operator (both prefix & postfix)
    d) Decrement, Overload -- operator (both prefix & postfix)
    e) Overload operator == (to check equality of two boxes), as a friend function
    f) Overload Assignment operator
    g) Check if it is a Cube or cuboid
    Write a program which takes input from the user for length, breath and height to test the above class.
25. Create a structure Student containing fields for Roll No., Name, Class, Year and Total Marks. Create 10 students and store them in a file.
26. Write a program to retrieve the student information from file created in previous question and print it in following format:
    Roll No. Name Marks
27. Copy the contents of one text file to another file, after removing all whitespaces.
28. Write a function that reverses the elements of an array in place. The function must accept only one pointer value and return void.14
29. Write a program that will read 10 integers from user and store them in an array. Implement array using pointers. The program will print the array elements in ascending and descending order.

COMPUTER APPLICATION- C-4

**Computer System Architecture**

(Credits: 06)

Total marks: 100 (ESE: 70; CCA: 30)

Pass marks: 40 (ESE: 28; CCA: 12)

*This paper provides the concepts system architecture, organization of a computer & design, memory organization, input-output organization.*

**UNIT I**

**Introduction:** Logic gates, boolean algebra, combinational circuits, circuit simplification, flip-flops and sequential circuits, decoders, multiplexers, registers, counters and memory units.

**UNIT II**

**Data Representation and Basic Computer Arithmetic:** Number systems, complements, fixed and floating point representation, character representation, addition, subtraction, magnitude comparison, multiplication and division algorithms for integers

**UNIT III**

**Basic Computer Organization and Design:** Computer registers, bus system, instruction set, timing and control, instruction cycle, memory reference, input-output and interrupt, Interconnection Structures, Bus Interconnection design of basic computer.

**UNIT IV**

**Central Processing Unit:** Register organization, arithmetic and logical micro-operations, stack organization, micro programmed control. Instruction formats, addressing modes, instruction codes, machine language, assembly language, input output programming, RISC, CISC architectures, pipelining and parallel architecture.

**Memory Organization Cache memory, Associative memory, mapping.**

**UNIT V**

**Input-Output Organization:** Input / Output: External Devices, I/O Modules, Programmed I/O, Interrupt-Driven I/O, Direct Memory Access, I/O Channels.

**Recommended Books:**


1. M. Mano, Computer System Architecture, Pearson Education 1992
2. A. J. Dos Reis, Assembly Language and Computer Architecture using C++ and JAVA, Course Technology, 2004th
3. W. Stallings, Computer Organization and Architecture Designing for Performance, 8 Edition, Prentice Hall of India,2009
4. M.M. Mano , Digital Design, Pearson Education Asia,2013.
5. Carl Hamacher, Computer Organization, Fifth edition, McGrawHill, 2012.

**COMPUTER APPLICATION-GE-201**
**INTRODUCTION TO PROGRAMMING**
(Credits: 04)

Total marks: 70 (ESE: 50; CCA: 20)
Pass marks: 28 (ESE: 20; Sessional: 8)

## Unit I

**Introduction to C and C++**

History of C and C++, Overview of Procedural Programming and Object-Orientation Programming, Using main() function, Compiling and Executing Simple Programs in C++.

**Data Types, Variables, Constants, Operators and Basic I/O**

Declaring, Defining and Initializing Variables, Scope of Variables, Using Named Constants, Keywords, Data Types, Casting of Data Types, Operators (Arithmetic, Logical and Bitwise), Using Comments in programs, Character I/O (getc, getchar, putc, putcharetc), Formatted and Console I/O (printf(), scanf(), cin, cout), Using Basic Header Files (stdio.h, iostream.h, conio.hetc).

## Unit II

**Expressions, Conditional Statements and Iterative Statements:** Simple Expressions in C++ (including Unary Operator Expressions, Binary Operator Expressions), Understanding Operators Precedence in Expressions, Conditional Statements (if construct, switch-case construct), Understanding syntax and utility of Iterative Statements (while, do-while, and for loops), Use of break and continue in Loops, Using Nested Statements (Conditional as well as Iterative)

## Unit III

**Functions and Arrays:** Utility of functions, Call by Value, Call by Reference, Functions returning value, Void functions, Inline Functions, Return data type of functions, Functions parameters, Differentiating between Declaration and Definition of Functions, Command Line Arguments/Parameters in Functions, Functions with variable number of Arguments.

Creating and Using One Dimensional Arrays ( Declaring and Defining an Array, Initializing an Array, Accessing individual elements in an Array, Manipulating array elements using loops), Use Various types of arrays (integer, float and character arrays / Strings) Two-dimensional Arrays (Declaring, Defining and Initializing Two Dimensional Array, Working with Rows and Columns), Introduction to Multi-dimensional arrays

## Unit IV

**Derived Data Types (Structures and Unions):** Understanding utility of structures and unions, Declaring, initializing and using simple structures and unions, Manipulating individual members of structures and unions, Array of Structures, Individual data members as structures, Passing and returning structures from functions, Structure with union as members, Union with structures as members.

**File I/O, Preprocessor Directives**

Opening and closing a file (use of fstream header file, ifstream, ofstream and fstream classes), Reading and writing Text Files, Using put(), get(), read() and write() functions, Random access in files, Understanding the Preprocessor Directives (#include, #define, #error, #if, #else, #elif, #endif, #ifdef, #ifndef and #undef), Macros.

## Unit V

**Using Classes in C++**

Principles of Object-Oriented Programming, Defining & Using Classes, Class Constructors, Constructor Overloading, Function overloading in classes, Class Variables &Functions, Objects

as parameters, specifying the Protected and Private Access, Copy Constructors, Overview of Template classes and their use.

**Inheritance and Polymorphism**

Introduction to Inheritance and Polymorphism

**Reference Books:**

1. HerbtzSchildt, "C++: The Complete Reference", Fourth Edition, McGraw Hill.2003
2. BjarneStroustrup, "The C++ Programming Language", 4th Edition, Addison-Wesley , 2013.
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9. Harry, H. Chaudhary, "Head First C++ Programming: The Definitive Beginner's Guide", First Create space Inc, O-D Publishing, LLC USA.2014
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11. Stanley B. Lippman, JoseeLajoie, Barbara E. Moo, "C++ Primer", Published by Addison-Wesley, 5th Edition, 2012

## COMPUTER APPLICATION-GE-201-LAB

### Practical on Introduction to C/C++ Programming

(Credits: 02)

Total marks: 30** (CCA + ESE = 30)

Pass marks: 12 (CCA + ESE = 12)

[**For each practical course, CCA component of total marks may be included in ESE in the following items along with practical experiments etc.: Practical experiments etc. max. marks = 21; Attendance max. marks = 05; Regularity in maintenance of laboratory note book max. marks = 02 and viva-voce max. marks = 02.]

1. WAP to print the sum and product of digits of an integer.
2. WAP to reverse a number.
3. WAP to compute the sum of the first n terms of the following series
S = 1+1/2+1/3+1/4+.....
4. WAP to compute the sum of the first n terms of the following series
S =1-2+3-4+5.....
5. Write a function that checks whether a given string is Palindrome or not. Use this function to find whether the string entered by user is Palindrome or not.
6. Write a function to find whether a given no. is prime or not. Use the same to generate the prime numbers less than 100.
7. WAP to compute the factors of a given number.
8. Write a macro that swaps two numbers. WAP to use it.
9. WAP to print a triangle of stars as follows (take number of lines from user):

```
*
***
```

*****
*******
*********

10. WAP to perform following actions on an array entered by the user:
    i) Print the even-valued elements
    ii) Print the odd-valued elements
    iii) Calculate and print the sum and average of the elements of array
    iv) Print the maximum and minimum element of array
    v) Remove the duplicates from the array
    vi) Print the array in reverse order The program should present a menu to the user and ask for one of the options. The menu should also include options to re-enter array and to quit the program.
11. WAP that prints a table indicating the number of occurrences of each alphabet in the text entered as command line arguments.
12. Write a program that swaps two numbers using pointers.
13. Write a program in which a function is passed address of two variables and then alter its contents.
14. Write a program which takes the radius of a circle as input from the user, passes it to another function that computes the area and the circumference of the circle and displays the value of area and circumference from the main() function.
15. Write a program to find sum of n elements entered by the user. To write this program, allocate memory dynamically using malloc() / calloc() functions or new operator.
16. Write a menu driven program to perform following operations on strings:13
    a) Show address of each character in string
    b) Concatenate two strings without using strcat function.
    c) Concatenate two strings using strcat function.
    d) Compare two strings
    e) Calculate length of the string (use pointers)
    f) Convert all lowercase characters to uppercase
    g) Convert all uppercase characters to lowercase
    h) Calculate number of vowels
    i) Reverse the string
17. Given two ordered arrays of integers, write a program to merge the two-arrays to get an ordered array.
18. WAP to display Fibonacci series (i)using recursion, (ii) using iteration
19. WAP to calculate Factorial of a number (i)using recursion, (ii) using iteration
20. WAP to calculate GCD of two numbers (i) with recursion (ii) without recursion.
21. Create Matrix class using templates. Write a menu-driven program to perform following Matrix Operations (2-D array implementation):
    a) Sum b) Difference c) Product d) Transpose
22. Create the Person class. Create some objects of this class (by taking information from the user). Inherit the class Person to create two classes Teacher and Student class. Maintain the
    respective information in the classes and create, display and delete objects of these two classes (Use Runtime Polymorphism).
23. Create a class Triangle. Include overloaded functions for calculating area. Overload assignment operator and equality operator.
24. Create a class Box containing length, breath and height. Include following methods in it:
    a) Calculate surface Area
    b) Calculate Volume

c) Increment, Overload ++ operator (both prefix & postfix)
d) Decrement, Overload -- operator (both prefix & postfix)
e) Overload operator == (to check equality of two boxes), as a friend function
f) Overload Assignment operator
g) Check if it is a Cube or cuboid
Write a program which takes input from the user for length, breath and height to test the above class.

25. Create a structure Student containing fields for Roll No., Name, Class, Year and Total Marks. Create 10 students and store them in a file.
26. Write a program to retrieve the student information from file created in previous question and print it in following format:
Roll No. Name Marks
27. Copy the contents of one text file to another file, after removing all whitespaces.
28. Write a function that reverses the elements of an array in place. The function must accept only one pointer value and return void.14
29. Write a program that will read 10 integers from user and store them in an array. Implement array using pointers. The program will print the array elements in ascending and descending order.

COMPUTER APPLICATION- C-5

**Data Structures**

(Credits: 04)

Total marks: 70 (ESE: 50; CCA: 20)

Pass marks: 28 (ESE: 20; CCA: 8)

*This paper provides the concepts of arrays, stacks, linked lists, queues, recursion, trees, hashing, searching & sorting and their representation in computer memory.*

**UNIT I**

**Arrays:** Single and Multi-dimensional Arrays, Sparse Matrices (Array and Linked Representation).

**Stacks:** Implementing single / multiple stack/s in an Array; Prefix, Infix and Postfix expressions, Utility and conversion of these expressions from one to another; Applications of stack; Limitations of Array representation of stack.

**UNIT II**

**Linked Lists:** Singly, Doubly and Circular Lists (Array and Linked representation); Normal and Circular representation of Stack in Lists; Self Organizing Lists; Skip Lists.

**Queues:** Array and Linked representation of Queue, De-queue, Priority Queues

**UNIT III**

**Recursion:** Developing Recursive Definition of Simple Problems and their implementation; Advantages and Limitations of Recursion; Understanding what goes behind Recursion (Internal Stack Implementation)

**Trees:** Introduction to Tree as a data structure; Binary Trees (Insertion, Deletion , Recursive and Iterative Traversals on Binary Search Trees); Threaded Binary Trees (Insertion, Deletion, Traversals); Height-Balanced Trees (Various operations on AVL Trees).

**UNIT IV**

**Searching and Sorting:** Linear Search, Binary Search, Comparison of Linear and Binary Search, Selection Sort, Insertion Sort, Insertion Sort, Shell Sort, Comparison of Sorting Techniques.

**UNIT V**

**Hashing:** Introduction to Hashing, Deleting from Hash Table, Efficiency of Rehash Methods, Hash Table Reordering, Resolving collusion by Open Addressing, Coalesced Hashing, Separate
Chaining, Dynamic and Extendible Hashing, Choosing a Hash Function, Perfect HashingFunction.

**Reference Books:**


1. Adam Drozdek, "Data Structures and algorithm in C++", Third Edition, Cengage Learning,
2012.
2. SartajSahni, Data Structures, "Algorithms and applications in C++", Second Edition, Universities Press, 2011.
3. Aaron M. Tenenbaum, Moshe J. Augenstein, YedidyahLangsam, "Data Structures Using C
and C++:, Second edition, PHI, 2009.
4. Robert L. Kruse, "Data Structures and Program Design in C++", Pearson, 1999.

5. D.S Malik, Data Structure using C++,Second edition, Cengage Learning, 2010.
6. Mark Allen Weiss, "Data Structures and Algorithms Analysis in Java", Pearson Education,
3rd edition, 2011
7. Aaron M. Tenenbaum, Moshe J. Augenstein, YedidyahLangsam, "Data Structures Using
Java, 2003.
8. Robert Lafore, "Data Structures and Algorithms in Java, 2/E", Pearson/ Macmillan Computer Pub,2003
9. John Hubbard, "Data Structures with JAVA", McGraw Hill Education (India) Private Limited; 2 edition, 2009
10. Goodrich, M. and Tamassia, R. "Data Structures and Algorithms Analysis in Java", 4th Edition, Wiley,2013
11. Herbert Schildt, "Java The Complete Reference (English) 9th Edition Paperback", Tata McGraw Hill, 2014.
12. D. S. Malik, P.S. Nair, "Data Structures Using Java", Course Technology, 2003.

COMPUTER APPLICATION- C-5- LAB

**Practical on Data Structures**

(Credits: 02)

Total marks: 30** (CCA + ESE = 30)

Pass marks: 12 (CCA + ESE = 12)

[**For each practical course, CCA component of total marks may be included in ESE in the following items along with practical experiments etc.: Practical experiments etc. max. marks = 21; Attendance max. marks = 05; Regularity in maintenance of laboratory note book max. marks = 02 and viva-voce max. marks = 02.]

*This paper provides the practical knowledge of data structure.*

1. Write a program to search an element from a list. Give user the option to perform Linear or Binary search. Use Template functions.
2. WAP using templates to sort a list of elements. Give user the option to perform sorting using Insertion sort, Bubble sort or Selection sort.
3. Implement Linked List using templates. Include functions for insertion, deletion and search of a number, reverse the list and concatenate two linked lists (include a function and also overload operator +).
4. Implement Doubly Linked List using templates. Include functions for insertion, deletion and search of a number, reverse the list.
5. Implement Circular Linked List using templates. Include functions for insertion, deletion and search of a number, reverse the list.
6. Perform Stack operations using Linked List implementation.
7. Perform Stack operations using Array implementation. Use Templates.
8. Perform Queues operations using Circular Array implementation. Use Templates.
9. Create and perform different operations on Double-ended Queues using Linked List implementation.

10. WAP to scan a polynomial using linked list and add two polynomial.
11. WAP to calculate factorial and to compute the factors of a given no. (i)using recursion, (ii) using iteration
12.WAP to display fibonacci series (i)using recursion, (ii) using iteration
13. WAP to calculate GCD of 2 number (i) with recursion (ii) without recursion
14. WAP to create a Binary Search Tree and include following operations in tree: (a) Insertion (Recursive and Iterative Implementation) (b) Deletion by copying (c) Deletion by Merging (d) Search a no. in BST
(e) Display its preorder, postorder and inorder traversals Recursively (f) Display its preorder, postorder and inorder traversals Iteratively (g) Display its level-by-level traversals (h) Count the non-leaf nodes and leaf nodes (i) Display height of tree (j) Create a mirror image of tree (k) Check whether two BSTs are equal or not
15. WAP to convert the Sparse Matrix into non-zero form and vice-versa.
16. WAP to reverse the order of the elements in the stack using additional stack.
17. WAP to reverse the order of the elements in the stack using additional Queue.
18. WAP to implement Diagonal Matrix using one-dimensional array.
19. WAP to implement Lower Triangular Matrix using one-dimensional array.
20. WAP to implement Upper Triangular Matrix using one-dimensional array.
21. WAP to implement Symmetric Matrix using one-dimensional array.
22. WAP to create a Threaded Binary Tree as per inorder traversal, and implement operations like finding the successor / predecessor of an element, insert an element, inorder traversal.
23. WAP to implement various operations on AVL Tree.

COMPUTER APPLICATION- C-6

**Operating Systems**

(Credits: 04)

Total marks: 70 (ESE: 50; CCA: 20)

Pass marks: 28 (ESE: 20; CCA: 8)

*This paper provides the basic concepts of operating system and its functions.*

**UNIT-I**

Operating System overview: Operating System as an extended machine and resource manager, operating system classification; Operating system architecture:Operating system mode and system calls

Processor Management Functions: Process model, Hierarchies and implementation; Process states and transitions, Multiprogramming, Multitasking, Multithreading, Levels of Schedulers and scheduling algorithms; micro-kernel architecture.

**UNIT-II**

Memory Management Functions: Memory management of single user operating system memory management for multi-user, Operating system, partition, swapping, paging, segmentation, virtual memory.

**UNIT-III**

Device Management Functions: I/O devices and controllers, interrupt handlers device independent I/O software, user level I/O software; Disk scheduling , clock hardware software; Terminal input output software.

**UNIT-IV**

File Management Functions: naming structure, types, access mechanism, attributes and operations; Hierarchical directory systems, Directory structure and directory operation; File space allocations; File sharing file locking; Symbolic links, Files protection and security, Distributed file system.

**UNIT-V**

Concurrent Programming, sequential and concurrent process, precedence graph, Bernstein Conditions, time dependency, critical node section, mutual exclusion problem, classical coordination problem, Deadlock handling, Inter-Process communication.

**Recommended Books:**


1. A Silberschatz, P.B. Galvin, G. Gagne, Operating Systems Concepts, 8th Edition, John Wiley Publications 2008.
2. A.S. Tanenbaum, Modern Operating Systems, 3rd Edition, Pearson Education 2007.
3. G. Nutt, Operating Systems: A Modern Perspective, 2nd Edition Pearson Education 1997.
4. W. Stallings, Operating Systems, Internals & Design Principles , 5th Hall of India. 2008.

Edition, Prentice.

5. M. Milenkovic, Operating Systems- Concepts and design, Tata McGraw Hill 1992.

COMPUTER APPLICATION- C-6- LAB

**Practical on UNIX/LINUX Programming**

(Credits: 02)

Total marks: 30** (CCA + ESE = 30)

Pass marks: 12 (CCA + ESE = 12)

[**For each practical course, CCA component of total marks may be included in ESE in the following items along with practical experiments etc.: Practical experiments etc. max. marks = 21; Attendance max. marks = 05; Regularity in maintenance of laboratory note book max. marks = 02 and viva-voce max. marks = 02.]

1. Installation of Linux Operating System and partitioning the disk.
2. Installing software packages in linux OS using GUI as well as command line.
3. Changing the default run level of a system
4. Mounting and un mounting a removable media.
5. Finding the list of all running processes and redirect the output in a file.
6. Use of different kill signals to kill a running process.
7. Bringing a process from back ground to fore ground and vice-versa.
8. Adding and managing user accounts.
9. Monitoring disk space quota and memory usage and redirect the output in a file.
10. Backup and restoring a file.
11. Compression and extracting a file. Use command line.
12. Configuring a network interface and assigning a default route.
13. Scheduling job using crontab.
14. Changing the ownership and access permission of file or directory. Use command line.
15. Copy, move and rename a file.
16. Configuring a ftp server
17. Assigning address of DNS.
18. Use of ssh, telnet, netstat, ping, route commands.
19. Use grep, awk, sed commands.
20. Use of redirection and piping.
21. Monitoring and managing system log infomation.
22. Basics of firewall using iptables.
23. Basics of configuring http server.
24. Managing different services in linux.
25. Monitoring the traffic going through a network interface.
26. Write shell script to
    i. Find factorial of a given number
    ii. Convert a decimal number to hexadecimal number

COMPUTER APPLICATION- C-7

**Computer Networks**

(Credits: 04)

Total marks: 70 (ESE: 50; CCA: 20)

Pass marks: 28 (ESE: 20; CCA: 8)

*This paper provides the basic concepts of networks and functions of different OSI reference model.*

**UNIT I**

**Introduction to Computer Networks:** Network definition; network topologies; network classifications; network protocol; layered network architecture; overview of OSI reference model; overview of TCP/IP protocol suite.

**Data Communication Fundamentals and Techniques:** Analog and digital signal; data-rate limits; digital to digital line encoding schemes; pulse code modulation; parallel and serial transmission; digital to analog modulation-; multiplexing techniques- FDM, TDM; transmission media.

**UNIT II**

**Networks Switching Techniques and Access mechanisms:** Circuit switching; packet switching- connectionless datagram switching, connection-oriented virtual circuit switching; dial-up modems; digital subscriber line; cable TV for data transfer.

**UNIT III**

**Data Link Layer Functions and Protocol:** Error detection and error correction techniques; data-link control- framing and flow control; error recovery protocols- stop and wait ARQ, go-back-n ARQ; Point to Point Protocol on Internet.

**Multiple Access Protocol and Networks:** CSMA/CD protocols; Ethernet LANS; connecting LAN and back-bone networks- repeaters, hubs, switches, bridges, router and gateways;

**UNIT IV**

**Networks Layer Functions and Protocols:** Routing; routing algorithms; network layer protocol of Internet- IP protocol, Internet control protocols.

**UNIT V**

**Transport Layer Functions and Protocols :** Transport services- error and flow control, Connection establishment and release- three way handshake;

**Overview of Application layer protocol:** Overview of DNS protocol; overview of WWW &HTTP protocol.

**Reference Books**

1. B. A. Forouzan: Data Communications and Networking, Fourth edition, THM ,2007.
2. A. S. Tanenbaum: Computer Networks, Fourth edition, PHI , 2002

COMPUTER APPLICATION- C-7- LAB

**Practical on Network Programming**

(Credits: 02)

Total marks: 30** (CCA + ESE = 30)

Pass marks: 12 (CCA + ESE = 12)

[**For each practical course, CCA component of total marks may be included in ESE in the following items along with practical experiments etc.: Practical experiments etc. max. marks = 21; Attendance max. marks = 05; Regularity in maintenance of laboratory note book max. marks = 02 and viva-voce max. marks = 02.]

*This paper provides the practical knowledge of network programming.*

1. Simulate Cyclic Redundancy Check (CRC) error detection algorithm for noisy channel.
2. Simulate and implement stop and wait protocol for noisy channel.
3. Simulate and implement go back n sliding window protocol.
4. Simulate and implement selective repeat sliding window protocol.
5. Simulate and implement distance vector routing algorithm
6. Simulate and implement Dijkstra algorithm for shortest path routing.
7. WAP to find the address of the local machine
8. WAP A program that prints the address of www.youtube.com
9. WAP A program that prints all the addresses of www.youtube.com
10. Write a program to implement following methods:

    public String getHostName( )
    public byte[] getAddress( )
    public String getHostAddress( )

11. Describe the following methods in brief:

    publicbooleanisAnyLocalAddress( )
    publicbooleanisLoopbackAddress( )

12. Write a program to testing the characteristics of an IP address i.e. you have to check whether given address is AnyLocalAddress, LoopbackAddress, LinkLocalAddress, SiteLocalAddress or MulticastAddress.
13. Write a program to enter the IP address of any node and check whether a particular node is reachable from the current host.
14. Write a program of protocol tester .It is a simple program for determining which protocols a virtual machine supports. It attempts to construct a URL object for each of 10 URL given below. If the protocol is not supported. aMalformedURLException is thrown and you know the protocol is not supported.

**Test protocols for following URL:**

1. http://www.adc.org
2. https://www.amazon.com/exec/obidos/order2/
3. file:///etc/passwd

4. ftp://metalab.unc.edu/pub/languages/java/javafaq
5. mailto:elharo@metalab.unc.edu
6. telnet://dibner.poly.edu/
7. nfs://utopia.poly.edu/usr/tmp/
8. gopher://gopher.anc.org.za/
9. verbatim:http://www.adc.org/
10. netdoc:/UsersGuide/release.html

**COMPUTER APPLICATION-GE-301**

**Computer Networks**

(Credits: 04)

Total marks: 70 (ESE: 50; CCA: 20)

Pass marks: 28 (ESE: 20; CCA: 8)

*This paper provides the basic concepts of networks and functions of different OSI reference model.*

**UNIT I**

**Introduction to Computer Networks:** Network definition; network topologies; network classifications; network protocol; layered network architecture; overview of OSI reference model; overview of TCP/IP protocol suite.

**Data Communication Fundamentals and Techniques:** Analog and digital signal; data-rate limits; digital to digital line encoding schemes; pulse code modulation; parallel and serial transmission; digital to analog modulation-; multiplexing techniques- FDM, TDM; transmission media.

**UNIT II**

**Networks Switching Techniques and Access mechanisms:** Circuit switching; packet switching- connectionless datagram switching, connection-oriented virtual circuit switching; dial-up modems; digital subscriber line; cable TV for data transfer.

**UNIT III**

**Data Link Layer Functions and Protocol:** Error detection and error correction techniques; data-link control- framing and flow control; error recovery protocols- stop and wait ARQ, go-back-n ARQ; Point to Point Protocol on Internet.

**Multiple Access Protocol and Networks:** CSMA/CD protocols; Ethernet LANS; connecting LAN and back-bone networks- repeaters, hubs, switches, bridges, router and gateways;

**UNIT IV**

**Networks Layer Functions and Protocols:** Routing; routing algorithms; network layer protocol of Internet- IP protocol, Internet control protocols.

**UNIT V**

**Transport Layer Functions and Protocols :** Transport services- error and flow control, Connection establishment and release- three way handshake;

**Overview of Application layer protocol:** Overview of DNS protocol; overview of WWW &HTTP protocol.

**Reference Books**

1. B. A. Forouzan: Data Communications and Networking, Fourth edition, THM ,2007.
2. A. S. Tanenbaum: Computer Networks, Fourth edition, PHI , 2002

**COMPUTER APPLICATION-GE-301-LAB**

**Practical on Network Programming**

(Credits: 02)

Total marks: 30** (CCA + ESE = 30)

Pass marks: 12 (CCA + ESE = 12)

[**For each practical course, CCA component of total marks may be included in ESE in the following items along with practical experiments etc.: Practical experiments etc. max. marks = 21; Attendance max. marks = 05; Regularity in maintenance of laboratory note book max. marks = 02 and viva-voce max. marks = 02.]

*This paper provides the practical knowledge of network programming.*

1. Simulate Cyclic Redundancy Check (CRC) error detection algorithm for noisy channel.
2. Simulate and implement stop and wait protocol for noisy channel.
3. Simulate and implement go back n sliding window protocol.
4. Simulate and implement selective repeat sliding window protocol.
5. Simulate and implement distance vector routing algorithm
6. Simulate and implement Dijkstra algorithm for shortest path routing.
7. WAP to find the address of the local machine
8. WAP A program that prints the address of www.youtube.com
9. WAP A program that prints all the addresses of www.youtube.com
10. Write a program to implement following methods:
    public String getHostName( )
    public byte[] getAddress( )
    public String getHostAddress( )

11. Describe the following methods in brief:
    publicbooleanisAnyLocalAddress( )
    publicbooleanisLoopbackAddress( )

12. Write a program to testing the characteristics of an IP address i.e. you have to check whether given address is AnyLocalAddress, LoopbackAddress, LinkLocalAddress, SiteLocalAddress or MulticastAddress.
13. Write a program to enter the IP address of any node and check whether a particular node is reachable from the current host.
14. Write a program of protocol tester .It is a simple program for determining which protocols a virtual machine supports. It attempts to construct a URL object for each of 10 URL given below. If the protocol is not supported. aMalformedURLException is thrown and you know the protocol is not supported.

**Test protocols for following URL:**

1. http://www.adc.org
2. https://www.amazon.com/exec/obidos/order2/
3. file:///etc/passwd
4. ftp://metalab.unc.edu/pub/languages/java/javafaq
5. mailto:elharo@metalab.unc.edu
6. telnet://dibner.poly.edu/
7. nfs://utopia.poly.edu/usr/tmp/
8. gopher://gopher.anc.org.za/
9. verbatim:http://www.adc.org/
10. netdoc:/UsersGuide/release.html

COMPUTER APPLICATION-SEC-1

**Open Source Software**

(Credit: 02)

Total marks: 70 (ESE: 50; CCA: 20)

Pass marks: 28 (ESE: 20; CCA: 8)

*Objective: This course provides an overview of the modern context and operation of free and open source software communities and associated software projects. The practical objective is to teach students how they can begin to participate in a FOSS project.*

**Unit I**

Introduction to OSS: introduction, need for open source applications-advantages, disadvantages, history, meaning and extraction of the terms free software and OSS, security and releiability, application of OSS.

**Unit II**

Linux basics: introduction, setting up environment, simple c file and compilation, kernel, basic commands, process: types of process, process states, creation of process, process priorities, scheduling policies, signals - types, sending & receiving signal.

**Unit III**

Android: introduction, open source android platform, history, android architecture, features, Delvik Virtual Machine (DVM), Android Virtual Device or Emulator, File System hierarchy, sample android app.

**Unit IV**

PHP basics: introduction, identifier, variable, constant, data types, operators, statements, PHP loops, PHP script execution, interaction of web browser & web server.

**Unit V**

Open source Grid Computing: introduction, open grid service architecture (OGSA), OGSA definition, OGSA basic services. Open Source Cloud, FOSS Cloud Software: Eucalyptus, OpenNebula – purpose.

**Text Book:**


1. M. N. Rao, “Fundamentals of Open Source Software: A Developer's Perspective”, PHI, 2015.
2. Understanding Open Source and Free Software Licensing – O’Reilly Media, 2011


**ONLINE READING / SUPPORTING MATERIAL:**

1. https://www.tutorialspoint.com/android/index.htm.
2. https://developer.android.com/samples/index.html
3. http://docs.oracle.com/javase/tutorial/index.htm (Available in the form of free downloadable e-books also).

**COMPUTER APPLICATION-SEC-1-LAB**

**Practical on Open Source Software**

(Credits: 02)

Total marks: 30** (CCA + ESE = 30)

Pass marks: 12 (CCA + ESE = 12)

[**For each practical course, CCA component of total marks may be included in ESE in the following items along with practical experiments etc.: Practical experiments etc. max. marks = 21; Attendance max. marks = 05; Regularity in maintenance of laboratory note book max. marks = 02 and viva-voce max. marks = 02.]

**Software Lab Based on Android Programming:**

1. Create ―Hello World‖ application. That will display ―Hello World‖ in the middle of the screen in the emulator. Also display ―Hello World‖ in the middle of the screen in the Android Phone.
2. Create an application with login module. (Check username and password).
3. Create spinner with strings taken from resource folder (res >> value folder) and on changing the spinner value, Image will change.
4. Create a menu with 5 options and and selected option should appear in text box.
5. Create a list of all courses in your college and on selecting a particular course teacher-in-charge of that course should appear at the bottom of the screen.
6. Create an application with three option buttons, on selecting a button colour of the screen will change.
7. Create and Login application as above. On successful login, pop up the message.
8. Create an application to Create, Insert, update, Delete and retrieve operation on the database.

COMPUTER APPLICATION- C-8

**Design and Analysis of Algorithms**

(Credits: 06)

Total marks: 100 (ESE: 70; CCA: 30)

Pass marks: 40 (ESE: 28; CCA: 12)

*This paper provides the concepts of algorithm design techniques, sorting and searching techniques, lower bound techniques, balance trees, graphs, dynamic programming and backtracking techniques.*

**UNIT-I**

Introduction: Writing Structured programs, Analyzing Algorithms, Stacks and Queues, Trees, Heaps and Heap sort, Graphs, Hashing.

**UNIT-II**

Divide and Conquer: The general concept, Binary Search, Finding the maximum and minimum, Merge sort, Quick sort, Selection sort, Strassen's matrix manipulation, Greedy methods, Minimum spanning trees.

**UNIT-III** Dynamic Programming: The General method, Multi stage graphs, All pairs shortest paths, Optimal binary search trees, Reliability design, The Travelling sales person Problem, Flow shop scheduling.

**UNIT-IV**

Basic search and traversal techniques: The techniques, Code generation, AND/OR graphs, Game trees, Biconnected components, Depth first search and Breadth first search

**UNIT-V**

Backtracking: the Queens problems, Introduction to NP- Hard and NP- Complete problems.

**Text Books:**


1.S. Sahni, and Horowitz, Rajasekaran, Computer Algorithm, Galgotia Publications.

2.Horowitz and Sahni, Fundamentals of Computer Algorithm,Galgotia Publications.

3.Aho, Hopcroft and Ullman ,Design and Analysis of Computer Algorithm, Addison-Wesley

4.S.E Good man and S. T Hedet,Introduction to the Design and Analysis of Algorithm


**Reference Books:**


1.S.KBasu, Design Methods and Analysis of Algorithms, PHI

2 Gilles Brassard and Paul Brantley, Algorithmic theory and Practices, PH1

3. Knuth, Fundamental Algorithms, the Art of computer programming, Vol-1

4.S. Sahni Analysis of Algorithms through C++, Tata McGraw Hill

COMPUTER APPLICATION- C-9

**Computer Graphics**

(Credits: 04)

Total marks: 70 (ESE: 50; CCA: 20)

Pass marks: 28 (ESE: 20; CCA: 8)

*This paper provides the basic concepts of computer graphics.*

**UNIT I**

Basic of Computer Graphics: Basic of Computer Graphics, Applications of computer graphics, Display devices, Random and Raster scan systems, Graphics input devices, Graphics software and standards.

Graphics Primitives: Points, lines, circles and ellipses as primitives, scan conversion algorithms for primitives, Fill area primitives including scan-line polygon filling, inside-outside test, boundary and flood-fill, character generation, line attributes, area-fill attributes, character attributers.

**UNIT II**

2D transformation and viewing: Transformations (translation, rotation, scaling), matrix representation, homogeneous coordinates, composite transformations, reflection and shearing, viewing pipeline and coordinates system, window-to-viewport transformation, clipping including point clipping, line clipping (cohen-sutherland, liang- bersky), polygon clipping.

**UNIT III**

3D concepts and object representation: 3D display methods, polygon surfaces, tables, equations, meshes, curved lies and surfaces, quadric surfaces, spline representation, cubic spline interpolation methods, Bazier curves and surfaces, B-spline curves and surfaces

**UNIT IV**

3D transformation and viewing: 3D scaling, rotation and translation, composite transformation, viewing pipeline and coordinates, parallel and perspective transformation, view volume and general (parallel and perspective) projection transformations

**UNIT V**

Visible surface detection concepts, back-face detection, depth buffer method, illumination, light sources, illumination methods (ambient, diffuse reflection, specular reflection), Color models: properties of light, XYZ, RGB, YIQ and CMY color models.

Concept of Animation and Morphing.

**Books Recommended:**


1. J.D.Foley, A.Van Dan, Feiner, Hughes Computer Graphics Principles & Practice 2nd edition Publication Addison Wesley 1990.
2. D.Hearn, Baker: Computer Graphics, Prentice Hall of India 2008.
3. D.F.Rogers Procedural Elements for Computer Graphics, McGraw Hill 1997.
4. D.F.Rogers, Adams Mathematical Elements for Computer Graphics, McGraw Hill 2nd edition 1989.

COMPUTER APPLICATION- C-9- LAB

**Practical on Computer Graphics**

(Credits: 02)

Total marks: 30** (CCA + ESE = 30)

Pass marks: 12 (CCA + ESE = 12)

[**For each practical course, CCA component of total marks may be included in ESE in the following items along with practical experiments etc.: Practical experiments etc. max. marks = 21; Attendance max. marks = 05; Regularity in maintenance of laboratory note book max. marks = 02 and viva-voce max. marks = 02.]

*This paper provides the practical knowledge of computer graphics.*

1. Write a C/C++ program to implement 2D transformation.
2. Write a C/C++ program to implement the mid-point ellipse drawing algorithm.
3. Write a C/C++ program to implement Brasenham's Circle drawing algorithm.
4. Write a C/C++ program to implement Brasenham's line drawing algorithm.
5. Write a C/C++ program to implement Cohen Sutherland Line Clipping algorithm.
6. Write a program using OpenGL to draw a circle of red colour inside of a rectangle of blue colour on a background of green colour.
7. Write a program in C or C++ to implement Scan-Line Polygon Filling Algorithm.

Write a program using OpenGL to perform a 3-Dimensional transformation, such as translation, rotation and reflection, on a given triangle.

COMPUTER APPLICATION- C-10

**Introduction to Database Systems**

(Credits: 04)

Total marks: 70 (ESE: 50; CCA: 20)

Pass marks: 28 (ESE: 20; CCA: 8)

***This paper provides the concepts of database management, ER modeling, data model, database design, transaction processing, file structure & indexing.***

**UNIT I**

**Introduction:** Characteristics of database approach, data models, database system architecture and data independence.

**Entity Relationship(ER) Modeling:** Entity types, relationships, constraints.

**UNIT II**

**Relation data model:** Relational model concepts, relational constraints, relational algebra, SQL queries

**UNIT III**

**Database design:** Mapping ER/EER model to relational database, functional dependencies, Lossless decomposition, Normal forms (upto BCNF).

**UNIT IV**

**Transaction Processing:** ACID properties, concurrency control

**UNIT V**

**File Structure and Indexing:** Operations on files, File of Unordered and ordered records, overview of File organizations, Indexing structures for files (Primary index, secondary index, clustering index), Multilevel indexing using B and B+ trees.

**Books Recommended:**


1. R. Elmasri, S.B. Navathe, Fundamentals of Database Systems 6th Edition, Pearson Education, 2010.
2. R. Ramakrishanan, J. Gehrke, Database Management Systems 3rd Edition, McGraw-Hill,
2002.
3. A. Silberschatz, H.F. Korth, S. Sudarshan, Database System Concepts 6th Edition, McGraw
Hill, 2010.
4. R. Elmasri, S.B. Navathe Database Systems Models, Languages, Design and application Programming, 6th Edition, Pearson Education,2013.

COMPUTER APPLICATION- C-10- LAB

**Practical onDatabase Systems**

(Credits: 02)

Total marks: 30** (CCA + ESE = 30)

Pass marks: 12 (CCA + ESE = 12)

[**For each practical course, CCA component of total marks may be included in ESE in the following items along with practical experiments etc.: Practical experiments etc. max. marks = 21; Attendance max. marks = 05; Regularity in maintenance of laboratory note book max. marks = 02 and viva-voce max. marks = 02.]

***This paper provides the practical knowledge of Database Management Systems.***

1. Create and use the following database schema to answer the given queries.

**EMPLOYEE Schema**

| **Field** | **Type** | **NULL** | **KEY** | **DEFAULT** |
|---|---|---|---|---|
| Eno | Char(3) | NO | PRI | NIL |
| Ename | Varchar(50) | NO | | NIL |
| Job_type | Varchar(50) | NO | | NIL |
| Manager | Char(3) | Yes | FK | NIL |
| Hire_date | Date | NO | | NIL |
| Dno | Integer | YES | FK | NIL |
| Commission | Decimal(10,2) | YES | | NIL |
| Salary | Decimal(7,2) | NO | | NIL |

**DEPARTMENT Schema**

| **Field** | **Type** | **NULL KEY** | **DEFAULT** |
|---|---|---|---|
| Dno | Integer | No PRI | NULL |
| Dname | Varchar(50) | Yes | NULL |

**Query List**

1. Query to display Employee Name, Job, Hire Date, Employee Number; for each employee with the Employee Number appearing first.
2. Query to display unique Jobs from the Employee Table.
3. Query to display the Employee Name concatenated by a Job separated by a comma.
4. Query to display all the data from the Employee Table. Separate each Column by a comma and name the said column as THE_OUTPUT.
5. Query to display the Employee Name and Salary of all the employees earning more than $2850.
6. Query to display Employee Name and Department Number for the Employee No= 7900.
7. Query to display Employee Name and Salary for all employees whose salary is not in the range of $1500 and $2850.
8. Query to display Employee Name and Department No. of all the employees in Dept 10 and Dept 30 in the alphabetical order by name.
9. Query to display Name and Hire Date of every Employee who was hired in 1981.

10. Query to display Name and Job of all employees who don‘t have a current Manager.
11. Query to display the Name, Salary and Commission for all the employees who earn commission.
12. Sort the data in descending order of Salary and Commission.

13. Query to display Name of all the employees where the third letter of their name is _A‘.
14. Query to display Name of all employees either have two _R‘s or have two _A‘s in their name and are either in Dept No = 30 or their Manger‘s Employee No = 7788.
15. Query to display Name, Salary and Commission for all employees whose Commission Amount is 14 greater than their Salary increased by 5%.
16. Query to display the Current Date.
17. Query to display Name, Hire Date and Salary Review Date which is the 1st Monday after six months of employment.
18. Query to display Name and calculate the number of months between today and the date each employee was hired.
19. Query to display the following for each employee <E-Name> earns < Salary> monthly but wants < 3 * Current Salary >. Label the Column as Dream Salary.
20. Query to display Name with the 1st letter capitalized and all other letter lower case and length of their name of all the employees whose name starts with _J‘, ‘A‘ and _M‘.
21. Query to display Name, Hire Date and Day of the week on which the employee started.
22. Query to display Name, Department Name and Department No for all the employees.
23. Query to display Unique Listing of all Jobs that are in Department # 30.
24. Query to display Name, Dept Name of all employees who have an _A‘ in their name.
25. Query to display Name, Job, Department No. And Department Name for all the employees working at the Dallas location.
26. Query to display Name and Employee no. Along with their Manger‘s Name and the Manager‘s employee no; along with the Employees‘ Name who do not have a Manager.
27. Query to display Name, Dept No. And Salary of any employee whose department No. and salary matches both the department no.And the salary of any employee who earns a commission.
28. Query to display Name and Salaries represented by asterisks, where each asterisk (*) signifies $100.
29. Query to display the Highest, Lowest, Sum and Average Salaries of all the employees
30. Query to display the number of employees performing the same Job type functions.
31. Query to display the no. of managers without listing their names.
32. Query to display the Department Name, Location Name, No. of Employees and the average salary for all employees in that department.
33. Query to display Name and Hire Date for all employees in the same dept. as Blake.
34. Query to display the Employee No. And Name for all employees who earn more than the average salary.
35. Query to display Employee Number and Name for all employees who work in a department with any employee whose name contains a _T‘.
36. Query to display the names and salaries of all employees who report to King.
37. Query to display the department no, name and job for all employees in the Sales department.

COMPUTER APPLICATION- GE-4

**Introduction to Database Systems**
(Credits: 04)

Total marks: 70 (ESE: 50; CCA: 20)
Pass marks: 28 (ESE: 20; CCA: 8)

***This paper provides the concepts of database management, ER modeling, data model, database design, transaction processing, file structure & indexing.***

**UNIT I**

**Introduction:** Characteristics of database approach, data models, database system architecture and data independence.
**Entity Relationship(ER) Modeling:** Entity types, relationships, constraints.

**UNIT II**

**Relation data model:** Relational model concepts, relational constraints, relational algebra, SQL queries

**UNIT III**

**Database design:** Mapping ER/EER model to relational database, functional dependencies, Lossless decomposition, Normal forms (upto BCNF).

**UNIT IV**

**Transaction Processing:** ACID properties, concurrency control

**UNIT V**

**File Structure and Indexing:** Operations on files, File of Unordered and ordered records, overview of File organizations, Indexing structures for files (Primary index, secondary index, clustering index), Multilevel indexing using B and B+ trees.

**Books Recommended:**

1. R. Elmasri, S.B. Navathe, Fundamentals of Database Systems 6th Edition, Pearson Education, 2010.
2. R. Ramakrishanan, J. Gehrke, Database Management Systems 3rd Edition, McGraw-Hill,
2002.
3. A. Silberschatz, H.F. Korth, S. Sudarshan, Database System Concepts 6th Edition, McGraw
Hill, 2010.
4. R. Elmasri, S.B. Navathe Database Systems Models, Languages, Design and application Programming, 6th Edition, Pearson Education,2013.

COMPUTER APPLICATION- GE-4- LAB

**Practical on Database Systems**
(Credits: 02)

Total marks: 30** (CCA + ESE = 30)
Pass marks: 12 (CCA + ESE = 12)

[**For each practical course, CCA component of total marks may be included in ESE in the following items along with practical experiments etc.: Practical experiments etc. max. marks = 21; Attendance max. marks = 05; Regularity in maintenance of laboratory note book max. marks = 02 and viva-voce max. marks = 02.]

***This paper provides the practical knowledge of Database Management Systems.***

1. Create and use the following database schema to answer the given queries.

**EMPLOYEE Schema**

| **Field** | **Type** | **NULL** | **KEY** | **DEFAULT** |
|---|---|---|---|---|
| Eno | Char(3) | NO | PRI | NIL |
| Ename | Varchar(50) | NO | | NIL |
| Job_type | Varchar(50) | NO | | NIL |
| Manager | Char(3) | Yes | FK | NIL |
| Hire_date | Date | NO | | NIL |
| Dno | Integer | YES | FK | NIL |
| Commission | Decimal(10,2) | YES | | NIL |
| Salary | Decimal(7,2) | NO | | NIL |

**DEPARTMENT Schema**

| **Field** | **Type** | **NULL** | **KEY** | **DEFAULT** |
|---|---|---|---|---|
| Dno | Integer | No | PRI | NULL |
| Dname | Varchar(50) | Yes | | NULL |

**Query List**

1. Query to display Employee Name, Job, Hire Date, Employee Number; for each employee with the Employee Number appearing first.
2. Query to display unique Jobs from the Employee Table.
3. Query to display the Employee Name concatenated by a Job separated by a comma.
4. Query to display all the data from the Employee Table. Separate each Column by a comma and name the said column as THE_OUTPUT.
5. Query to display the Employee Name and Salary of all the employees earning more than $2850.
6. Query to display Employee Name and Department Number for the Employee No= 7900.

7. Query to display Employee Name and Salary for all employees whose salary is not in the range of $1500 and $2850.
8. Query to display Employee Name and Department No. of all the employees in Dept 10 and Dept 30 in the alphabetical order by name.
9. Query to display Name and Hire Date of every Employee who was hired in 1981.
10. Query to display Name and Job of all employees who don‘t have a current Manager.
11. Query to display the Name, Salary and Commission for all the employees who earn commission.
12. Sort the data in descending order of Salary and Commission.

13. Query to display Name of all the employees where the third letter of their name is _A‘.
14. Query to display Name of all employees either have two _R‘s or have two _A‘s in their name and are either in Dept No = 30 or their Manger‘s Employee No = 7788.
15. Query to display Name, Salary and Commission for all employees whose Commission Amount is 14 greater than their Salary increased by 5%.
16. Query to display the Current Date.
17. Query to display Name, Hire Date and Salary Review Date which is the 1st Monday after six months of employment.
18. Query to display Name and calculate the number of months between today and the date each employee was hired.
19. Query to display the following for each employee <E-Name> earns < Salary> monthly but wants < 3 * Current Salary >. Label the Column as Dream Salary.
20. Query to display Name with the 1st letter capitalized and all other letter lower case and length of their name of all the employees whose name starts with _J‘, ‘A‘ and _M‘.
21. Query to display Name, Hire Date and Day of the week on which the employee started.
22. Query to display Name, Department Name and Department No for all the employees.
23. Query to display Unique Listing of all Jobs that are in Department # 30.
24. Query to display Name, Dept Name of all employees who have an _A‘ in their name.
25. Query to display Name, Job, Department No. And Department Name for all the employees working at the Dallas location.
26. Query to display Name and Employee no. Along with their Manger‘s Name and the Manager‘s employee no; along with the Employees‘ Name who do not have a Manager.
27. Query to display Name, Dept No. And Salary of any employee whose department No. and salary matches both the department no. And the salary of any employee who earns a commission.
28. Query to display Name and Salaries represented by asterisks, where each asterisk (*) signifies $100.
29. Query to display the Highest, Lowest, Sum and Average Salaries of all the employees
30. Query to display the number of employees performing the same Job type functions.
31. Query to display the no. of managers without listing their names.
32. Query to display the Department Name, Location Name, No. of Employees and the average salary for all employees in that department.
33. Query to display Name and Hire Date for all employees in the same dept. as Blake.
34. Query to display the Employee No. And Name for all employees who earn more than the average salary.
35. Query to display Employee Number and Name for all employees who work in a department with any employee whose name contains a _T‘.
36. Query to display the names and salaries of all employees who report to King.
37. Query to display the department no, name and job for all employees in the Sales department.

**COMPUTER APPLICATION-SEC-2**

**Programming with Python**

**(**Credits: 02**)**

Total marks: 70 (ESE: 50; CCA: 20)

Pass marks: 28 (ESE: 20; CCA: 8)

*Objective: This course provides the basics of Python. The subject will help in learning the basic data types, variables, control flow statements, functions and classes of Python and also how to write a Python program.*

**Unit 1**

Planning the Computer Program: Concept of problem solving, Problem definition,Program design, Debugging, Types of errors in programming, Documentation.
Techniques of Problem Solving: Flowcharting, decision table, algorithms, Structured programming concepts, Programming methodologies viz. top-down and bottom-up programming.

**Unit 2**

Overview of Programming: Structure of a Python Program, Elements of Python.
Introduction to Python: Python Interpreter, Using Python as calculator, Python shell, Indentation. Atoms, Identifiers and keywords, Literals, Strings, Operators (Arithmetic operator, Relational operator, Logical or Boolean operator, Assignment, Operator, Ternary operator, Bit wise operator, Increment or Decrement operator)

**Unit 3**

Creating Python Programs: Input and Output Statements, Control statements (Branching, Looping, Conditional Statement, Exit function, Difference between break, continue and pass.), Defining Functions, default arguments, Errors and Exceptions.Iteration and Recursion: Conditional execution, Alternative execution, Nested conditionals, the return statement, Recursion, Stack diagrams for recursive functions, Multiple assignment, the while statement, Tables, Two-dimensional tables.

**Unit 4**

Strings and Lists: String as a compound data type, Length, Traversal and the for loop,
String slices, String comparison, A find function, Looping and counting, List values, Accessing elements, List length, List membership, Lists and for loops, List operations, List deletion. Cloning lists, Nested lists

**Unit 5**

Object Oriented Programming: Introduction to Classes, Objects and Methods, Standard Libraries.Data Structures: Arrays, list, set, stacks and queues.Searching and Sorting: Linear and Binary Search, Bubble, Selection and Insertion sorting.

**References:**


1. T. Budd, Exploring Python, TMH, 1st Ed, 2011.
2. Allen Downey, Jeffrey Elkner, Chris Meyers. How to think like a computer scientist: learning with Python / 1st Edition,2012 – Freely available online.
3. http://docs.python.org/3/tutorial/index.html

4. http://interactivepython.org/courselib/static/pythonds

**COMPUTER APPLICATION-SEC-2-LAB**

**Practical on Programming with Python**

**(**Credits: 02**)**

Total marks: 30** (CCA + ESE = 30)

Pass marks: 12 (CCA + ESE = 12)

[**For each practical course, CCA component of total marks may be included in ESE in the following items along with practical experiments etc.: Practical experiments etc. max. marks = 21; Attendance max. marks = 05; Regularity in maintenance of laboratory note book max. marks = 02 and viva-voce max. marks = 02.]

1. Using for loop, print a table of Celsius/Fahrenheit equivalences. Let c be the Celsius temperatures ranging from 0 to 100, for each value of c, print the corresponding Fahrenheit temperature.
2. Using while loop, produce a table of sins, cosines and tangents. Make a variable x in range from 0 to 10 in steps of 0.2. For each value of x, print the value of sin(x), cos(x) and tan(x).
3. Write a program that reads an integer value and prints “leap year” or “not a leap year”.
4. Write a program that takes a positive integer n and then produces n lines of output shown as follows.
   For example enter a size: 5
   *
   **
   ***
   ****
   *****
5. Write a function that takes an integer ‘n’ as input and calculates the value of 1 + 1/1! + 1/2! + 1/3! + … + 1/n
6. Write a function that takes an integer input and calculates the factorial of that number.
7. Write a function that takes a string input and checks if it’s a palindrome or not.
8. Write a list function to convert a string into a list, as in list (‘abc’) gives [a, b, c].
9. Write a program to generate Fibonacci series.
10. Write a program to check whether the input number is even or odd.
11. Write a program to compare three numbers and print the largest one.
12. Write a program to print factors of a given number.
13. Write a method to calculate GCD of two numbers.
14. Write a program to sort a list using insertion sort and bubble sort and selection sort..

COMPUTER APPLICATION- C-11

**Programming in Java**

(Credits: 04)

Total marks: 70 (ESE: 50; CCA: 20)

Pass marks: 28 (ESE: 20; CCA: 8)

*This paper provides the programming concepts in Java.*

**Unit-I**

Introduction to Java, Basic Features, Java Virtual Machine Concepts, A Simple Java Program, Primitive Data Type and Variables, Java Keywords, Integer and Floating Point Data Type, Character and Boolean Types, Declaring and Initialization Variables, Java Operators, Expressions, control statements, Arrays.

**Unit-II**

Class Fundamentals, Creating objects ,Assigning object reference variables ,Introducing Methods, Method overloading, Static methods, Constructors, overloading constructors, This Keyword, Using Objects as Parameters, Argument passing, Returning objects ,Method Overriding, Garbage Collection, The Finalize ( ) Method, Inheritance Basics, Access Control,Multilevel Inheritance, Abstract Classes ,Polymorphism ,Final Keyword, Package, Defining Package, CLASSPATH, Package naming, Accessibility of Packages, Using Package Members, Interfaces, Implementing Interfaces, Interface and Abstract Classes.

**Unit-III**

Exception Handling,Multithreaded Programming, I/O in Java,Text Streams, Stream Tokenizer, Buffered Stream , Print Stream, Random Access File, The String Class, String Buffer Class, StringTokenizerand Methods.

**Unit-IV**

Applets Programming, Building User Interface with AWT, Swing-based GUI, Layouts and Layout Manager, Container.

**Unit-V**

Java Database Connectivity; Establishing a Connection; Transactions with Database.

**Reference Books**


1. Ken Arnold, James Gosling, David Homes, "The Java Programming Language", 4th Edition, 2005.
2. James Gosling, Bill Joy, Guy L Steele Jr, GiladBracha, Alex Buckley"The Java Language
Specification, Java SE 8 Edition (Java Series)", Published by Addison Wesley, 2014.
3. Joshua Bloch, "Effective Java" 2nd Edition,Publisher: Addison-Wesley, 2008.
4. Cay S. Horstmann, GaryCornell, "Core Java 2 Volume 1 ,9thEdition,Printice Hall.2012
5. Cay S. Horstmann, Gary Cornell, "Core Java 2 Volume 2 - Advanced Features)", 9th Edition, Printice Hall.2013
6. Bruce Eckel, "Thinking in Java", 3rd Edition, PHI, 2002.
7. E. Balaguruswamy, "Programming with Java", 4th Edition, McGraw Hill.2009.
8. Paul Deitel, Harvey Deitel, "Java: How to Program", 10th Edition, Prentice Hall, 2011.
9. "Head First Java", Orielly Media Inc. 2nd Edition, 2005.
10. David J. Eck, "Introduction to Programming Using Java", Published by CreateSpace Independent Publishing Platform, 2009.
11. John R. Hubbard, "Programming with JAVA", Schaum's Series, 2nd Edition, 2004.

COMPUTER SCIENCE- C-11- LAB

**Practical on Programming in JAVA**

(Credits: 02)

Total marks: 30** (CCA + ESE = 30)

Pass marks: 12 (CCA + ESE = 12)

[**For each practical course, CCA component of total marks may be included in ESE in the following items along with practical experiments etc.: Practical experiments etc. max. marks = 21; Attendance max. marks = 05; Regularity in maintenance of laboratory note book max. marks = 02 and viva-voce max. marks = 02.]

*This paper provides the practical knowledge of programming in Java.*

1. To find the sum of any number of integers entered as command line arguments
2. To find the factorial of a given number
3. To learn use of single dimensional array by defining the array dynamically.
4. To learn use of lenth in case of a two dimensional array
5. To convert a decimal to binary number
6. To check if a number is prime or not, by taking the number as input from the keyboard
7. To find the sum of any number of integers interactively, i.e., entering every number from the keyboard, whereas the total number of integers is given as a command line argument
8. Write a program that show working of different functions of String and StringBufferclasss like setCharAt(), setLength(), append(), insert(), concat()and equals().
9. Write a program to create a ―distance‖ class with methods where distance is computed in terms of feet and inches, how to create objects of a class and to see the use of this pointer
10. Modify the ―distance‖ class by creating constructor for assigning values (feet and inches) to the distance object. Create another object and assign second object as reference variable to another object reference variable. Further create a third object which is a clone of the first object.
11. Write a program to show that during function overloading, if no matching argument is found, then java will apply automatic type conversions(from lower to higher data type).
12. Write a program to show the difference between public and private access specifiers. The program should also show that primitive data types are passed by value and objects are passed by reference and to learn use of final keyword.
13. Write a program to show the use of static functions and to pass variable length arguments in a function.
14. Write a program to demonstrate the concept of boxing and unboxing.
15. Create a multi-file program where in one file a string message is taken as input from the user
and the function to display the message on the screen is given in another file (make use of Scanner package in this program).
16. Write a program to create a multilevel package and also creates a reusable class to generate Fibonacci series, where the function to generate Fibonacci series is given in a different file belonging to the same package.
17. Write a program that creates illustrates different levels of protection in classes/subclasses belonging to same package or different packages.
18. Write a program ―DivideByZerothat takes two numbers a and b as input, computes a/b, and invokes Arithmetic Exception to generate a message when the denominator is zero.
19. Write a program to show the use of nested try statements that emphasizes the sequence of checking for catch handler statements.

20. Write a program to create your own exception types to handle situation specific to your application (Hint: Define a subclass of Exception which itself is a subclass of Throwable).
21. Write a program to demonstrate priorities among multiple threads.
22. Write a program to demonstrate multithread communication by implementing synchronization among threads (Hint: you can implement a simple producer and consumer problem).
23. Write a program to create URL object, create a URLConnection using the openConnection() method and then use it examine the different components of the URLand content.
24. Write a program to implement a simple datagram client and server in which a message that is typed into the server window is sent to the client side where it is displayed.
25. Write a program that creates a Banner and then creates a thread to scrolls the message in the banner from left to right across the applet‘s window.
26. Write a program to get the URL/location of code (i.e. java code) and document(i.e. html file).
27. Write a program to demonstrate different mouse handling events like mouseClicked(), mouseEntered(), mouseExited(), mousePressed, mouseReleased() and mouseDragged().
28. Write a program to demonstrate different keyboard handling events.
29. Write a program to generate a window without an applet window using main() function.
30. Write a program to demonstrate the use of push buttons.

COMPUTER APPLICATION- C-12

**Management Information System**

(Credits: 06)

Total marks: 100 (ESE: 70; CCA: 30)

Pass marks: 40 (ESE: 28; CCA: 12)

**UNIT I**

Foundation of Information Systems: Introduction to Information system in business, fundamentals of information systems, solving business problems with information system, concept of balanced MIS, effectiveness & efficiency criteria.

**UNIT II**

Information Technology- A manager's overview, managerial overview of computer hardware and software, telecommunication, Database management.

**UNIT III**

Business Application of Information Technology Internet & electronic commerce, internet, extranet & enterprise solution, information system for business operations, information system for management decision support, information for strategic advantage.

**UNIT IV**

Managing Information Technology Enterprise & global management, security & ethical challenges planning & implement ting changes.

**UNIT V**

Advanced Concepts in Information Systems, Enterprise Resource Planning Supply Chain management, CRM procurement management System.

**TEXT BOOKS**


1. O Brian," management Information System", TMH
2. Murdick.: information System for Modern management", PHI

COMPUTER APPLICATION-DSE-1

**Numerical & Statistical Methods**

(Credits: 04)

Total marks: 70 (ESE: 50; CCA: 20)

Pass marks: 28 (ESE: 20; CCA: 8)

*This paper provides the basic concepts of numerical & statistical methods.*

## UNIT – I

Numerical methods – errors in numerical calculations – transcendental equation – introduction – Bisection method – iteration method – Method of false position – Newton – raphson method.

## UNIT – II

Interpolation – Newton's formulae (forward & backward) for interpolation – Lagrenge's interpolation formula – simultaneous linear equations – Gauss Elimination and Gauss Jordan methods – Gauss Seidal method.

## UNIT – III

Numerical integration – Trapezoidal and Simpson's rule – differential equation – euler, runge-kutta and predictor and corrector methods.

## UNIT – IV

Mathematical expectation – variance – covariance – moment generating functions – theoretical distributions – binomial, poisson, normal and exponential distributions – MGFS of these distribution – additive properties – recurrence relations for the moment.

## UNIT – V

Linear correlation and regression – properties of correlation and regression coefficients – numerical problems for finding the correlation and regression coefficients.

**Text Books:**

1. S.S.Sastry, Introductory methods of numerical analysis, PHI, New Delhi 1982.
2. M.K.Jain, S.R.K.Iyengar and R.K.Jain "Numerical methods for science and Engineering computation", Wiley Eastern Limited – 2nd edition –1995.
3. Gupta S.C.andKapoor V.K.-Fundamentals of Statistics – Sultan Chand and Sons – New Delhi (1994).
4. BajpatA.C.CalI.M.andFairdyJ.A.Statistical methods for Engineering and Scientists – John Wiley and Sons

**Reference Books**

1. Rajaraman,Computer oriented Numerical Methods, PHI

2.Venkataraman, Numerical Computations
3.Stoer, Bullrich, Computer Oriented Numerical Methods, Springer Verlag
4..Krishnamurthy, E.V. Sen, Computer based Numerical Algorithm, Ease West Press.

COMPUTER APPLICATION -DSE-1-LAB

**Practical on Numerical Methods**

(Credits: 02)

Total marks: 30** (CCA + ESE = 30)

Pass marks: 12 (CCA + ESE = 12)

[**For each practical course, CCA component of total marks may be included in ESE in the following items along with practical experiments etc.: Practical experiments etc. max. marks = 21; Attendance max. marks = 05; Regularity in maintenance of laboratory note book max. marks = 02 and viva-voce max. marks = 02.]

*This paper provides the practical knowledge of numerical methods.*

1. Write a program to find the root of an equation by successive approximation.
2. Write a program to solve a system of equations by Gauss Elimination method.
3. Write a program to find the value of a function by Lagrange's interpolation method.
4. Fit a straight line $y = mx + c$ to the following data by the least squares method:

   | | | | | | | |
   |---|---|---|---|---|---|---|
   | X: | 7 | 9 | 13 | 15 | 20 | 22 |
   | Y: | 3 | 7 | 8 | 12 | 13 | 18 |

   Write a general program for a straight line, least squares, curve fitting.
5. Write a program for the evaluation of an integration value of a function by Trapezoidal rule.
6. Write a program to solve an equation by Newton – Raphson method.
7. Write a program to solve a set of first order simultaneous differential equations using Runga – Kutta second order method.
8. Write a program to evaluate the definite integral $\int_0^1 e^{\cos x}$ by using the Simpson's rule.

COMPUTER APPLICATION- DSE-2

**Internet Technologies**

(Credits: 04)

Total marks: 70 (ESE: 50; CCA: 20)

Pass marks: 28 (ESE: 20; CCA: 8)

*This paper provides the concepts of Internet technologies that are used to develop different interfaces through which user communicate and share information.*

**UNIT I**

Internet, structure of internet, history of internet, Internet protocol: TCP/IP, SLIP, PPP, Network and network devices, Addressing in Internet - DNS, domain name and their organisation, understanding the Internet protocol address, Client-server concept- architecture and application.

Evolution of www, basic features, servers, http, URL, search engine, searching categories, hypertext.

**UNIT II**

Basic HTML, HTML tags, creating list in HTML, hyperlinks, multimedia, HTML forms, tables in HTML, frames in HTML, image maps, style sheets in HTML. DHTML, XML-Introduction, Need for XML, Advantages, simple XML programs, DTD.

**UNIT III**

Creating interactive and dynamic web pages with JavaScript: Client-side scripting languages, JavaScript overview; constants, variables, operators, expressions and statements; user-defined & built-in-functions; properties and methods of built-in objects, client-side form validation.

**UNIT IV**

Server side scripting: ASP, ASP variables, procedures, conditionals, looping, forms, cookies, session, ASP AJAX, ASP VB functions, Accessing a database from an ASP page, ADO connect, ADO recordset.

**UNIT V**

Servlet:overview, environment setup, life cycle, applet vs servlet, form data, client request, server response, http codes, writing filters, exceptions, database access.

**Text/ Reference Books**


1) The Internet – Complete M.L Young ; Tata McGraw Hill
2) Mastering JavaScript and Jscript by J. Jaworski ; BPB Publication
3) Dynamic HTML –the definitive references by D. Godman: Shroff Publishers
4) Understanding XHTML by D.P Nagpal: Wheeler Publishing.
5) Daniel Minoli. Internet and Internet Engineering Tata McGraw-Hill Edition (for Unit I & II)
6) Active Server pages, Keith & Jill, VIkas.
7) Java Script, Gosslin, Vikas
8) Core Java 2, VOl II, Addison Wesley
9) Java Servlets Developer's Guide, Karl Moss, McGraw-Hill/Osborne, 2002

COMPUTER APPLICATION- DSE-2- LAB

**Practical on Internet Technologies**

(Credits: 02)

Total marks: 30** (CCA + ESE = 30)

Pass marks: 12 (CCA + ESE = 12)

[**For each practical course, CCA component of total marks may be included in ESE in the following items along with practical experiments etc.: Practical experiments etc. max. marks = 21; Attendance max. marks = 05; Regularity in maintenance of laboratory note book max. marks = 02 and viva-voce max. marks = 02.]

*This paper provides the practical knowledge of network programming.*

**HTML**

1. Create a HTML document consisting of HTML heading, paragraphs and images.
2. Create a HTML document and insert comments in the HTML source code and insert horizontal lines.
3. Construct HTML document to set the font of a text , size of the font, style of the font.
4. Create a HTML document to show how to create hyperlinks.
5. Create a HTML document to use an image as a link.
6. Create a HTML document to open link in a new browser window.
7. Create a HTML document to jump to another part of a document (on the same page).
8. Create a HTML document to insert images from another folder or another server.
9. Create an image-map, with clickable regions.
10. Create a HTML document with all table elements (Table, Caption, Table Row, Table Data element, Table Heading Element, THEAD, TFOOT, TBODY)
11. Create HTML document to make an unordered list, an ordered list, different types of ordered lists, different types of unordered lists, Nested list, Definition list.
12. Create HTML form with the all FORM elements (text fields, password field, Checkboxes, Radio buttons, Select elements, Drop-down list with a pre-selected value, Textarea (a multi-line text input field) and buttons.
13. Create HTML document with all Frame elements (FRAMESET, FRAME, NOFRAMES, and INLINE FRAME).
14. Create a HTML document to add AUDIO and VIDEO.
15. Create a HTML document to aligning images (Let the image float to the left/right of a paragraph).
16. Create a HTML document to jump to a specified section within a frame
17. Construct a HTML document with CSS to Set the background colour of a page.
18. Construct a HTML document with CSS to set an image as the background of a page
19. Construct HTML document with CSS to Set the text color of different elements and align the text.
20. Construct HTML document to set different colours to visited/unvisited links, Specify a background colour for links

**XML**

21. Construct an XML document that contain information about products of an organization.
22. Construct an XML document that contain information of 5 students (such as roll no., name , address, class).
23. Construct an XML document that contain details of 10 books.

**JAVAScript**

24. Write a program in javasrcript to accept a name from the user and display the same name in an alert box.
25. Write a program in javasrcript to display a message in a confirm box.
26. Write a program in javasrcript to display the message _time is running out' in the status bar.
27. Write a program in JavaScript to enter marks of a student and find his/her grade according to the following:
    if marks>=90 then grade A
    if marks>=80 then grade B
    if marks>=70 then grade C
    if marks>=60 then grade D
    else fail.
28. Write a program in JavaScript to create a button and when the button is clicked the message _Hello World' is displayed on an alert box.
29. Write a program in JavaScript to accept 2 nos from the user and show the working of all arithmetic operators.
30. Write a program in JavaScript to accept 2 strings and concatenate them.
31. Write a program in JavaScript to display the current date and time.
32. Write a program in JavaScript to find the length of an array.
33. Write a program in JavaScript to check whether a string is palindrome or not.
34. Write a program in JavaScript that responds to a mouse click anywhere on the page(using mouse click).
35. Write a program in JavaScript to display the contents of a check box in a alert box.
36. Write a program to validate a form in the user id and password forms.
37. Write a program in JavaScript to create a welcome cookie, Button animation, Image map with added JavaScript Simple timing, Timing event in an infinite loop

**Servlet/ASP :**

38. Develop a webpage with hypothetical data to do the following
    i. Connecting to database.
    ii. Insert Data To Database.
    iii. Retrieving Data From Database
    iv. Updating Data IntoDatabase.
    v. Deleting Data From Database –

COMPUTER APPLICATION- C-13

# FUNDAMENTALS OF E-COMMERCE

(Credits: 06)

Total marks: 100 (ESE: 70; CCA: 30)
Pass marks: 40 (ESE: 28; CCA: 12)

**UNIT I**

Introduction to E-Commerce forces behind E Commerce Industry Framework, Brief history of E commerce, Inter organizational E commerce, intra organizational E commerce, consumer to Business Electronic commerce Architectural frame work.

Network Infrastructure for E commerce, Market forces behind I-Way, Component of I- Way, access Equipment, Global Information Distribution Network Broad band Telecommunication.

**UNIT II**

Mobile Commerce:Introduction to mobile commerce, Mobile computing Applications, Wireless Application protocols, WAP technology, Mobile information devices.

Web Security: Introduction to Web security, Firewalls & Transaction security, client Server Network, Emerging client server security threats, firewalls & Network Security.

**UNIT III**

Encryption: World Wide Web & Security, Encryption, Transaction security, secret Key Encryption, Public Key Encryption, Virtual Private Networks (VPM),Implementation & Management issues.

**UNIT IV**

Electronic Payments: Overview of Electronic Payments, Digital Token base Electronic payment system, Smart cards, credit card/ Debit card base EPS, emerging financial Instruments. Home Banking, Online Baking.

**UNIT V**

Net Commerce: EDI, EDI Application in Business, legal requirement in E commerce, Introduction to Supply Chain management, CRM, issues in Customer Relationship management.

**TEXT BOOKS:**


1. Ravi Kalakota& Andrew Whinston," Fronticrs of Electronic Commerce", Addison Wesly
2. Debial Amor, "The e business revolution", Addison Wesly.
3. Sokol, " From EDI to Electronic Commerce: A business Initiative", TMH

**REFERENCE BOOKS:**


1. Diwan& Sharma, “E commerce”, Excel.
2. Bajaj & nag “E Commerce: The Cutting”.

**COMPUTER APPLICATION- C-14**

**Software Engineering**

(Credits: 06)

Total marks: 100 (ESE: 70; CCA: 30)

Pass marks: 40 (ESE: 28; CCA: 12)

*This paper provides the concepts software engineering theory.*

**UNIT I**

**Introduction:** The Evolving Role of Software, Software Characteristics, Changing Nature of Software, Software Engineering as a Layered Technology, Software Process Framework, Framework and Umbrella Activities, Process Models, Capability Maturity Model Integration (CMMI).

**UNIT II**

**Requirement Analysis:** Software Requirement Analysis, Initiating Requirement Engineering Process, Requirement Analysis and Modeling Techniques, Flow Oriented Modeling, Need for SRS, Characteristics and Components of SRS.

**Software Project Management:** Estimation in Project Planning Process, Project Scheduling.

**UNIT III**

**Risk Management:** Software Risks, Risk Identification, Risk Projection and Risk Refinement, RMMM Plan.

**Quality Management:** Quality Concepts, Software Quality Assurance, Software Reviews, Metrics for Process and Projects.

**UNIT IV**

**Design Engineering:** Design Concepts, Architectural Design Elements, Software Architecture, Data Design at the Architectural Level and Component Level, Mapping of Data Flow into Software Architecture, Modeling Component Level Design.

**UNIT V**

**Testing Strategies & Tactics:** Software Testing Fundamentals, Strategic Approach to Software Testing, Test Strategies for Conventional Software, Validation Testing, System testing, Black-Box Testing, White-Box Testing and their type, Basis Path Testing.

**Recommended Books:**


1. R.S. Pressman, Software Engineering: A Practitioner‘s Approach (7th Edition), McGraw-
Hill, 2009.
2. P. Jalote, An Integrated Approach to Software Engineering (2nd Edition), Narosa Publishing House, 2003.
3. K.K. Aggarwal and Y. Singh, Software Engineering ( 2nd Edition), New Age International
Publishers, 2008.
4. I. Sommerville, Software Engineering (8th edition), Addison Wesley, 2006.
5. D. Bell, Software Engineering for Students (4th Edition), Addison-Wesley, 2005.
6. R. Mall, Fundamentals of Software Engineering (2nd Edition), Prentice-Hall of India, 2004.

**COMPUTER APPLICATION-DSE-3**

**PHP Programming**

**(**Credits: 04**)**

Total marks: 70 (ESE: 50; CCA: 20)

Pass marks: 28 (ESE: 20; CCA: 8)

*Objective: This course will provide the basic knowledge of PHP. It will help to learn the PHP keywords and statements, database connectivity and will also help to get a job in software industry as web developer.*

**Unit I**

PHP introduction, inventions and versions, important tools and software requirements (like Web Server, Database, Editors etc.).PHP with other technologies, scope of PHP

**Unit II**

Design and write PHP programs – Basic PHP syntax, structure and coding techniques, variables, constants, expressions and operators.

**Unit III**

Use of arrays, string, numbers, built-in functions and global variables

**Unit IV**

**Handling HTML form with PHP:**

- Capturing Form Data
- GET and POST form methods
- Dealing with multi value fields
- Redirecting a form after submission

**Unit V**

**U**se PHP to send email, upload files dynamically; MySQL Database- setup, connection, insert, update, delete, display records

**References :**

1. Steven Holzner, "PHP: The Complete Reference Paperback", McGraw Hill Education (India), 2007.

2. Timothy Boronczyk, Martin E. Psinas, "PHP and MYSQL (Create-Modify-Reuse)", Wiley India Private Limited, 2008.

3. Robin Nixon, "Learning PHP, MySQL, JavaScript, CSS & HTML5", 3rd Edition Paperback, O'reilly, 2014.

4. Luke Welling, Laura Thompson, PHP and MySQL Web Development", 4th Edition, Addition Paperback, Addison-Wesley Professional,2008.

5. David Sklar, Adam Trachtenberg, "PHP Cookbook: Solutions & Examples for PHP Programmers", 2014.

**COMPUTER APPLICATION-DSE-3-LAB**

**Practical on PHP Programming**

**(**Credits: 02**)**

Total marks: 30** (CCA + ESE = 30)

Pass marks: 12 (CCA + ESE = 12)

[**For each practical course, CCA component of total marks may be included in ESE in the following items along with practical experiments etc.: Practical experiments etc. max. marks = 21; Attendance max. marks = 05; Regularity in maintenance of laboratory note book max. marks = 02 and viva-voce max. marks = 02.]

1. Write a program to find greatest of three numbers.
2. Write a program to find gross salary of a person
3. Write a program to find grade of a student given his marks.
4. Write a program to find divisor or factorial of a given number.
5. Write a program to print first ten natural numbers.
6. Write a program to print first ten even and odd numbers.
7. Implement the PHP/MySQL concepts listed in theory.
8. Implement some exercises of semester using PHP as front end.

**COMPUTER APPLICATION-DSE-4**

**Project work/ Dissertation**

(Credits: 06)

Total marks: 100 (ESE: 70; CCA: 30)

Pass marks: 40 (ESE: 28; CCA: 12)

This option to be offered only in 6th Semester.

The students will be allowed to work on any project based on the concepts studied in core / elective or skill based elective courses.

The group size should be maximum of three (03) students.

Each group will be assigned a teacher as a supervisor who will handle both their theory as well lab classes.

A maximum of Four (04) projects would be assigned to one teacher.